



PAGASA

ANNUAL REPORT 2011



**Achieving A World Class Atmospheric/
Meteorological - Hydrological Agency**

"tracking the sky...helping the country"

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message from the Secretary

In 2011, fierce storms especially during the last quarter whipped the country unkindly. Precious lives were lost, communities grappled with the desolation, and the nation persisted to stand resilient. In all these, a small group of men and women stayed watchful, at times deep into the night. Often with little rest, they crunch the numbers to follow the path of a storm in an edgy chase to save lives and reduce potential damages to properties and infrastructure. Without fail, they endure. Without fail, they are mostly unnoticed.

I congratulate the hardworking men and women of the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) for another year of committed service to the Filipino. This quiet diligence is a reaffirmation of an intrepid brand of public service in the face of a natural force that's fickle and extreme.

Tropical storms Pedring and Sendong wrenched the spotlight to the wave of hydrometeorological phenomena that appear increasingly ferocious. Even at PAGASA-DOST's best monitoring and forecasting performance, the forces of nature can seem so immensely disruptive. PAGASA-DOST grapples with this reality. Its best and collective effort will always be tested in every storm. This is why it needs the best available instruments and technology to raise its climate forecasting capability. It's a cycle that apparently cannot stop because it's basically a life-saving vocation.

Our weathermen's technical dexterity was deservedly enhanced by the recent completion of several projects notably the acquisition and deployment of Doppler radars and Automatic Weather Stations. These had enhanced PAGASA-DOST accuracy in weather forecasting and warnings.

This year, the nation can look forward to further improvement in the weather agency's services with the operation of additional Doppler radars and installation of several AWSs in strategic locations nationwide. This is a significant step closer to its continuing vision to help create an informed and proactive population acclimatizes to cyclical atmospheric hazards.

I assure you of DOST's unfaltering support in the years to come.

Mabuhay!


MARIO G. MONTEJO



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message
from the **Undersecretary for Research
and Development**



It is my great pleasure to greet the officials and employees of DOST-PAGASA-DOST for their exemplary performance in 2011.

The feat that PAGASA-DOST has achieved in the past year is a clear indication of its vast improved services. The tropical cyclone forecasting capability of PAGASA-DOST was proven to have been immensely enhanced. This is due to the continued acquisition of modern equipment to upgrade the present system. To complement this, various technical trainings here and abroad are being provided for further personnel development. The other important PAGASA-DOST service upgraded was its hydrological forecasting efficiency. This was manifested through the improvement of monitoring and warning system in the major river basins in Luzon. One of which the most recent was the Agno River Flood Forecasting System.

The Sendong incident in Northern Mindanao compelled the government to establish a flood forecasting system in the whole of Mindanao patterned after the existing ones in Luzon. PAGASA opened its arms to the challenge.

As it still focuses in further improving its weather forecasting capability through the utilization of modern equipment as in Doppler radars and Automatic Weather Stations, the agency now is tasked to pursue the establishment of hydrological forecasting throughout the country. It may seem burdensome for its limited workforce but the priceless reward that makes it heartwarming is the trust bestowed by the national government to PAGASA-DOST. The national leadership trusts PAGASA-DOST is the bottom line.

With these, I am mighty proud of what PAGASA-DOST has achieved. Even with the limited period that I have led the institution, the thought of working with competent and dedicated workforce to consistently achieve a noble objective is a prized moment in my entire career.

A handwritten signature in black ink, appearing to read 'Graciano P. Yumul, Jr.' with a stylized flourish at the end.

GRACIANO P. YUMUL, JR., D. Sc.



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message from the Administrator

The year 2011 was marred by a sad note in the country's history of calamities resulting from extreme meteorological hazards. In late September, Tropical Storm Pedring flooded most parts of Luzon leaving many people homeless and claimed numerous lives. Central Luzon was worst hit. Damage to properties, infrastructure and agriculture were widespread temporarily stunting the growth of national economy. Just before Christmas, our countrymen in Northern Mindanao were devastated by Tropical Storm Sendong as flashfloods caused the deaths of hundreds. The Sendong disaster was reminiscent of the Ormoc tragedy in 1991 and recalled images of the Fukushima tsunami disaster in March 2011.

These tragic events, however, did not affect the credibility of PAGASA-DOST as facts showed the agency had never been remiss in its duty as a national hydrometeorological warning agency during the occurrence of the two killer storms. Weather advisories and bulletins were proven to have been issued by PAGASA-DOST prior and during the passage of Pedring and Sendong. President Aquino himself had cleared the agency of any fault in the twin natural calamities. Equally important, the trust and confidence of our countrymen with the agency remained high.

With this uplifting development, we become even more committed to perform to the best in our mission to serve the needs of our countrymen. The trust bestowed upon us would remain a motivating factor to accomplish what is expected from us. From the lowest rank of our employees to the highest, the technical and support groups, our skilled weather forecasters and gutsy personnel in the field stations, their combined efforts would effectively ensure attainment of this mission.

As we enter another year, PAGASA-DOST is on the right track of its well planned road map. Modern equipment and facilities are already operational to boost and enhance the weather forecasting capabilities of the agency. We expect the installation of additional Automatic Weather Stations (AWSs) to gather critical observational data in as many areas around the country.

We have fast tracked the operation of Doppler radars in strategic locations to serve as a dependable tool for a more accurate weather and rainfall forecasting. The commissioning of the other radars this year will further strengthen our service capability in these concerns.

Finally, let me assure our countrymen, in behalf of my colleagues at PAGASA-DOST that a new era in weather forecasting is at hand to protect us all from the lurking dangers of hydro meteorological phenomena.



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A handwritten signature in blue ink, appearing to read 'N. Servando'.

NATHANIEL T. SERVANDO, Ph. D.





Nathaniel T. Servando
ADMINISTRATOR

The ADMINISTRATOR

Dr. Nathaniel T. Servando current Administrator of the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA)-DOST is a Career Official with a CESO IV rank. He was appointed as Acting Administrator on January 31, 2011 and took the Oath of Office from President Benigno S. Aquino III on March 1, 2011. Later, on August 9, 2011, he became a full pledge Administrator after granting a CESO IV rank from the President. Keen for new experience, responsibility and accountability, Dr. Servando has held various sensitive positions in the Agency such as Deputy Director for Research and Development in 2004-2010 and as Officer-in-Charge of the Office of the Deputy Administrator for Operations and Services in 2010, prior to his appointment as PAGASA Administrator.



OATH TAKING CEREMONY
DR. NATHANIEL T. SERVANDO
ADMINISTRATOR
DOST-PAGASA



A native of Ajuy, Iloilo, Dr. Servando is a graduate of B.S. in Electrical Engineering at the University of Negros Occidental Recoletos (UNO-R) in 1988. He obtained his Master's and Ph. D. degrees in Meteorology at the University of the Philippines in Diliman in 1994 and 1999, respectively. He was a recipient of Japanese Government (Monboshu) scholarship for a 2-year Masters Degree in Marine Meteorology at the University of the Ryukus in Okinawa, Japan from 1996-1998.

Aside from his position in PAGASA, he also worked as Professional Lecturer at the Institute of Environmental Science and Meteorology, College of Science, UP-Diliman in 2000-2001 and in 2005. He was among the recipients of Achievement Award given by the National Research Council of the Philippines (NRCP) during its 77th General Assembly in 2010.

Self-driven, results-oriented with positive outlook, Dr. Servando joined PAGASA-DOST as a Meteorologist trainee in 1989 and rose from the ranks as Weather Specialist I assigned at the Weather

Division, up to the position of Administrator.

As dignified, low-keyed leader with a strong desire to achieve, excel and evolve, he complemented the progress and development of PAGASA-DOST with significant innovations in its forecasting capabilities. He has led the Agency to come up with faster and efficient weather monitoring, and more reliable and credible forecasts and warnings to better serve the country and people.

Dr. Servando is cognizant of the present needs therefore he find ways to be more responsive to the changing needs of the times and to be an effective instrument in national development. Better strategies have been formulated such as: issuance of 1-hour warning updates, utilization of the Doppler radars, laymanized its bulletins/advisories, and on June 2012, Rainfall alert System in Metro Manila was implemented.

Dr. Servando is fully committed to provide and implement dynamic, workable solutions to the challenges facing the Agency.





NEW TECHNOLOGIES acquired by PAGASA

A major breakthrough in the upgrading of the forecasting capability of PAGASA is the Automation of Forecasting System. This was achieved through the acquisition of automated observation facilities, centralized data processing system and creation of telecommunication backbone system. Under the automation project, PAGASA has so far installed additional data gathering and monitoring facilities to fully augment the existing network. Among these are the Doppler radars, Automatic Weather Stations (AWS), Automatic Raingauge, Aviation Weather Observing Stations (AWOS), one wind profiler, two marine buoys and the highly modern Integrated High Performance Computing System (iHPC).



The **Doppler radar** is capable of detecting rainfall intensity and storm structure and can measure the full extent of precipitation over large areas. The ultimate goal is to provide sufficient warning to the public for implementation of disaster mitigation strategies.

The **AWS** is an automated version of a traditional weather station. The data collected by AWS are temperature, pressure, humidity, rainfall and wind direction. The system can report near real time using the Global Telecommunications System (GTS) or save the data for later recovery.





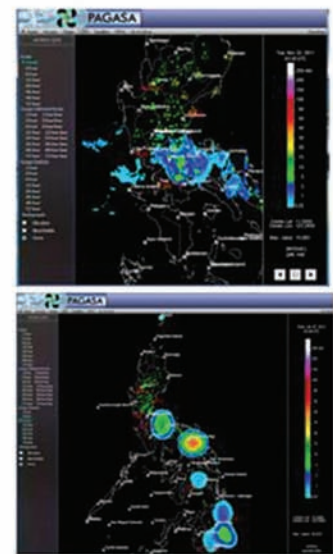
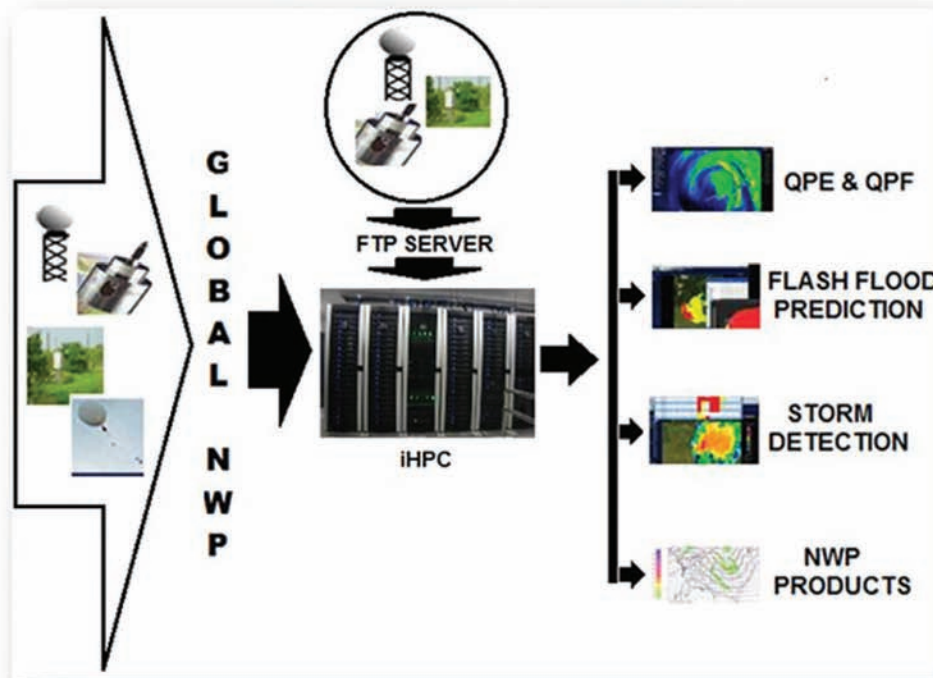
The **AWOS** is a vital component for airport terminal weather forecast accuracy to safeguard landing and taking-off aircrafts from severe weather systems. These automated airport weather stations utilize sensor suites that are designed to serve aviation and meteorological observation needs for safe and efficient aviation operations and weather forecasting.



Integrated High Performance Computing System (iHPCS)

iHPCS Integrates, Processes & Display data

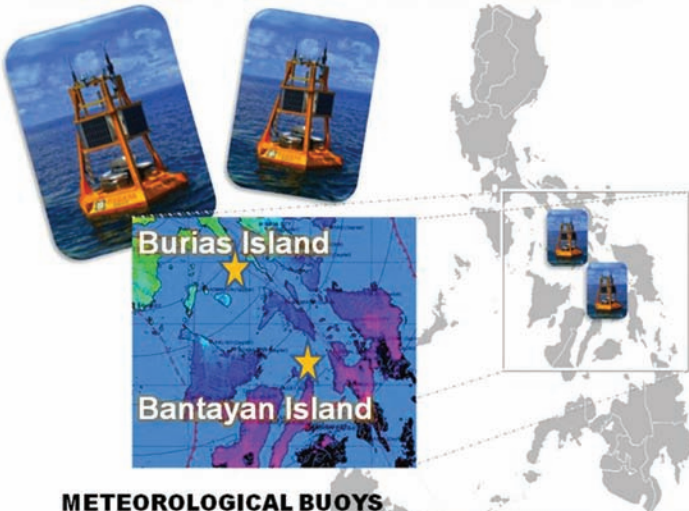
- to have an accurate and timely hourly warnings of severe weather disturbances that develop/enter the PAR.



The main component of the PAGASA automation program is the Integrated High Performance Computing System (iHPC). The iHPC is now used for the automation of the numerical weather prediction-based mesoscale weather, hydromet forecast with nowcasting capabilities. This is also very useful in the area of research and development. The iHPC operates as a fast central processing system that aids in the formulation of 3 hourly weather typhoon bulletins, advisories and warnings.



2 OFF-SHORE MARINE METEOROLOGICAL BUOYS



METEOROLOGICAL BUOYS
- addressing safety of Maritime sector during extreme weather events



The **Wind Profiler** is meteorological observational equipment that utilizes radar or sound waves to detect the wind speed and direction at various elevations above the ground. The data derived from the use of wind profiler is an important tool to meteorological and aviation interests. Considered as weather sentinels of the sea, Marine Buoys are moored and stationed in coastal areas to measure and transmit barometric pressure, wind speed and direction, and air



Main Server at AMSS, WD, PAGASA-POST
MAMA

and sea surface temperature. Moored Buoys also measure the height, period and direction of wave propagation. At present, Marine meteorological data from Marine Buoys are considered useful understanding of ocean climatology resulting to an enhanced efficiency of maritime navigation.



The WORKSTATIONS
Left>- Observers' >-- Forecasters'



MAJOR SERVICES

HIGHLIGHTS OF ACCOMPLISHMENT

Weather Forecasting and Tropical Cyclone Warning Services

PAGASA has regularly issued public weather forecasts, including five-day weather outlook, shipping and aviation forecasts. PAGASA has also provided specially packaged weather information for Mt. Mayon, Mt. Bulusan and other selected areas. During the year, (19) tropical cyclones entered the Philippine Area of Responsibility (PAR) as shown in Figure 1. The occurrences of TCs are within the normal condition.

The benefits gained through the provision of forecasting and warning services in terms of preparedness and mitigation on the adverse impacts of tropical cyclone, reduce that losses may not be expressed in concrete terms. But definitely, the immeasurable gains redounded to the advantage of the local communities, in particular, and the nation in general.

Likewise, on-going implementation of the projects for the upgrading of forecasting and warning system of PAGASA, such as, the JICA Doppler radar projects (Virac, Guiuan & Aparri), Mindanao Doppler radars (Tampakan and Hinatuan) and Cebu Doppler radar were almost completed, while the PGMA Doppler radar in Subic and Tagaytay were completed and now operational.

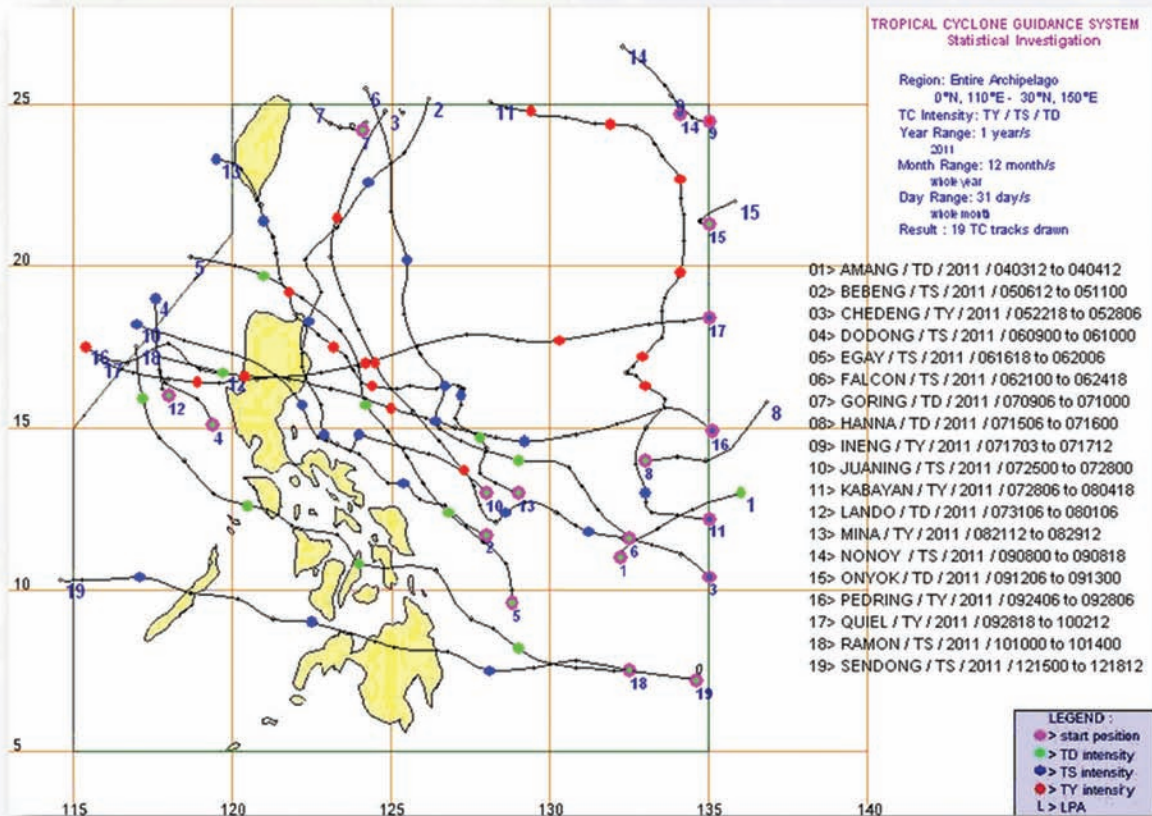


Figure 1. Shows the list Tropical Cyclones that entered the Philippine Area of Responsibility (PAR) in 2011

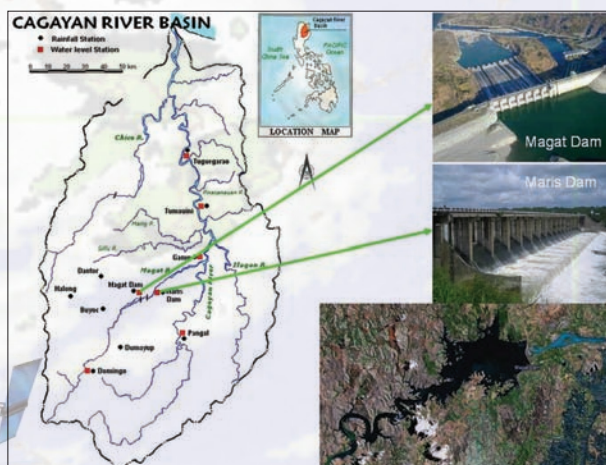
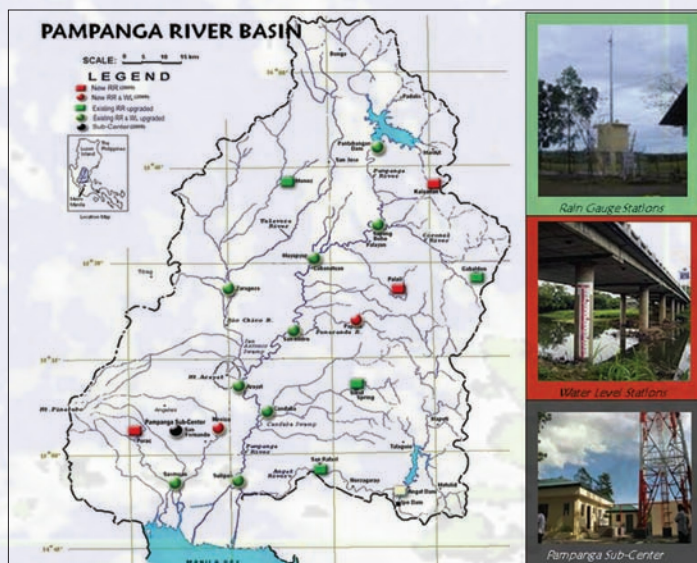
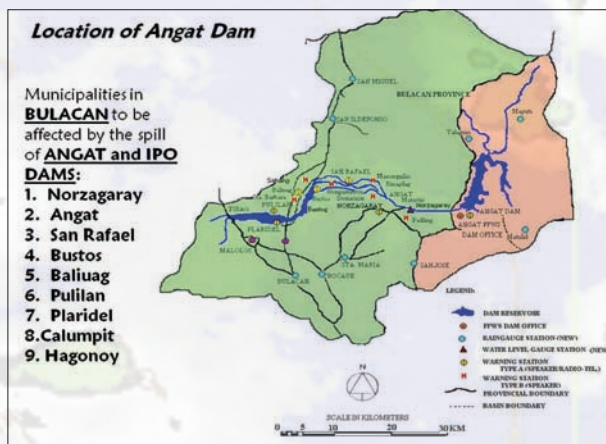


Flood Forecasting and Hydrometeorological Services

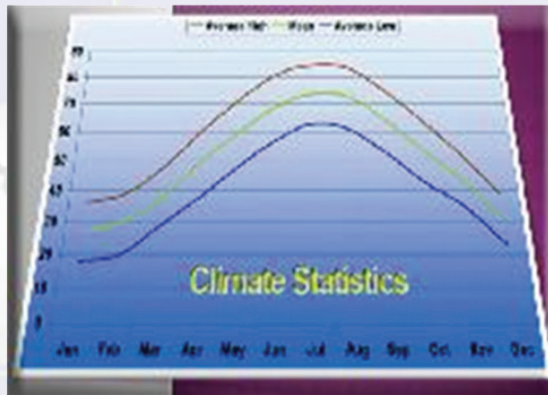
Ongoing implementation of projects for the improvement of flood forecasting and warning system includes the “Improvement of Flood Forecasting and Warning System for Magat Dam and Downstream Communities” (Norwegian Agency for Development Cooperation- Norad) 2010-2012, “Strengthening of Flood Forecasting & Warning System (FFWS) for Dam Operation” (JICA-TCP) and “Strengthening of Flood Forecasting and Warning System for Bicol River Basin”. Likewise, installation of automatic weather station, water level sensors and automatic rain gauges in collaboration with DOST- ASTI-is also being undertaken.

Information provided for flood disaster preparedness, prevention and mitigation included 200 flood bulletins for Pampanga, Agno, Bicol and Cagayan (PABC) River Basins and 2,078 general flood advisories. PAGASA has vigorously issued 1,230 hydrological forecasts for the PABC River Basins through its telemetry and multiplex telecommunications network.

Flood and storm surge hazard mapping and vulnerability analysis is another important activity being undertaken by the Agency aimed to enhance the effectiveness of efforts in reducing loss of lives and damages caused by natural hazards.



Climatological and Agrometeorological Services



The Climatological and Agrometeorological Division (CAD) consistently provided support to the agricultural sector. Vital agro-meteorological information were disseminated to the farmers for farming activities proper farm management and necessary planning. Farmers make use of the information to increase income by minimizing weather induced losses and to prevent unnecessary waste of time and material input. For the year, 365 Daily Farm Weather Forecasts and Advisories (FWFA) were issued to 6,825 recipients. Likewise, 10-day Regional-Agro weather forecasts and advisories for agriculture were provided while 36 Philippine Agroclimatic Review & Outlook were also issued to 1,080 recipients. Other beneficial climatological information were also published.

Increasing demand for climate forecasts as important inputs in agricultural planning for climate sensitive crops, such as rice and corn during the occurrence of extreme climate events, has been observed. Since the Philippines relies chiefly on rice and corn as staple food, the application of climate forecasts for agriculture will be replicated in all the agricultural areas in the country. In addition, agro-meteorological research stations will also be established in state colleges and universities to obtain the database as well as the information for studies on cropping calendar, plant pest and disease control. Increased collaboration to improve the crop yield must be strengthened with state universities and colleges. Likewise implementation of the project - MDGF 1656: Strengthening the Philippines Institutional Capacity to Adapt to Climate Change, a Spanish grant & UNDP project and Climate Change Adaptation Project, funded by World Bank, has also been undertaken.





Astronomical Services

As the official time keeper of the Philippines, PAGASA is responsible for maintaining and disseminating the Philippine Standard Time (PST). It operates a precise standard clock from which the setting of time pieces may be referred. Under normal conditions, the PAGASA Observatory broadcasts time signals every hour on the hour. For the year, a total of 9,408 time check requests through telephone, mostly in Metro Manila, were accommodated including synchronization of time for all TV and radio stations in Metro Manila.

To promote Astronomy in the countryside, PAGASA conducted several activities such as Mobile planetarium, planetarium shows, stargazing and telescoping sessions for 35,004 students and science teachers in various schools in Luzon which generated an income of P139,625.00. Likewise, the agency disseminated 852 astronomical information packages to students and science teachers which also generated an income of P 29,350.00.




Telescoping/Stargazing



Research and Development

On research and development activities, PAGASA stepped up its efforts to develop systems and techniques to improve its operational forecasting and warning capabilities. These activities are supportive of the R&D priorities of the Department of Science and Technology (DOST), which aim primarily to enhance agricultural and industrial productivity, water resources and energy production. For this year, four (4) completed researches were published in the International Science Institute (ISI) listed journals.



FORECASTING NUMBER OF DRY DAYS FOR THE BENEFIT OF FARMERS AND RICE PRODUCTION IN THE PHILIPPINES

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Climate and Rice

- QR Food security poses a great threat from unpredictable changes in climate;
- QR The importance of climate, as an agricultural aspect, is crucial if the geographic situation, ENSO and global warming are taken into account (WMO, 2004);
- QR Timing of different activities like harvesting of palay (rice) is most effective during dry days; also drying should be done over several dry days so that palay grains have enough time to dry. If the grain is threshed while it is damp, it becomes predisposed to damage (Kulima, 1995);
- QR Despite the growing use of irrigation, rainfed rice production remains a vital source of income in the Philippines—in particular, for poorer farmers (Hossain et al 2000)

Research Questions:


- (1) What new climate information can be integrated and utilised for the benefit of farmers and rice production in the Philippines?
- (2) How can seasonal dry day forecast be introduced to and accepted by farmers of the Western Visayas Region as a new tool for agricultural planning and decision-making to enhance their preparedness for climate variability?

Data and Methods:


- Daily rainfall data - from three meteorological stations in Western Visayas Region (Iloilo, Roxas and Negros Occidental)
Source: Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA)
- SST data - average across 80–180E, 20S–30N from July to September and January to March, with three months lead time, (i.e. for observed July to September SST, data is downloaded from Echam 4.5 GCM runs done in October, with values from July, August September SST. Hence, a difference of three months for lead time that correspond to the October -November-December dataset.
- Agricultural data - Bureau of Agricultural Statistics (BAS)
- Dry day index - a day with 1 mm of rain or less; processed using Climatological Index Calculator available at ASMC, Singapore (<http://www.weather.gov.sg/wip>)
- Constructed the time series, built the regression model and then analysed using the Climate Predictability Tool (CPT v10.9) of International Research Institute (IRI) for Climate and Society, in a 5-length cross-validation window.

The CPT is also designed to perform model validation and produce forecast given predicted SST data (Mason, 2005).


Study Area



Map of Western Visayas (Region VI) with six provinces that correspond to the study area



Monthly mean rainfall and number of rainy days in Iloilo, one of the meteorological stations in Region VI



Volume of Palay Production from 1994-2010 showing Western Visayas Region with highest rainfed rice production

Basic Facts:

- 52 % agricultural region; 35.4 % riceland
- major proportion of rainfed crop is cultivated
- Region with the most number of cities

Dry day forecasting and communicating with farmers

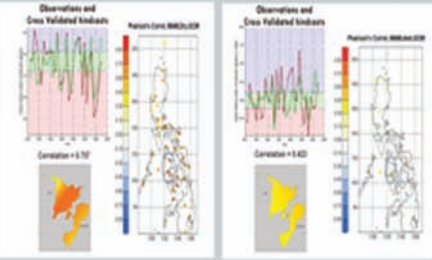
In the Philippines, the use and dissemination of climate forecast are complex issues and maybe impeded by financial, technical and cultural barriers, thus an effective forecast communication is needed.

To build an effective forecast communication in the study area, the following actions have been recognised:


- forecasting dry day as a potential operational forecast product by the national meteorological and hydrological centre of the Philippines (PAGASA) for the benefit of farmers and various stakeholders;
- further research and capacity enhancement of climate personnel on communicating climate science and seasonal forecasts;
- the emergence of the Climate Field School:
 - as an instrument to introduce the new type of forecast information and in incorporating weather and climate information in decision making for agriculture by the national and local agricultural officers;
 - enhancing the capacity of local farmers, extension workers and other stakeholders on the use, access and understanding of seasonal climate forecast.

Dry day is more predictable than rainfall amount

The statistical model showed that the correlation is higher for number of dry days, 0.757 than rainfall amount with correlation of 0.423 during March-April-May season, an indication of more predictability. During October-November-December (OND) season, correlations for dry days and rainfall amounts are 0.510 and 0.485, respectively (not shown). Thus, seasonal dry day forecast is more skillful than models that try to predict the seasonal rainfall amount.



Correlation = 0.757 (Dry Days) and Correlation = 0.423 (Rainfall)



Correlation = 0.510 (Dry Days) and Correlation = 0.485 (Rainfall)

IPCC Climate Impacts 2011 17-20 October 2011 International Pacific Research Centre University of Hawaii Honolulu, USA



Climate Change Projections in Some Asian Countries

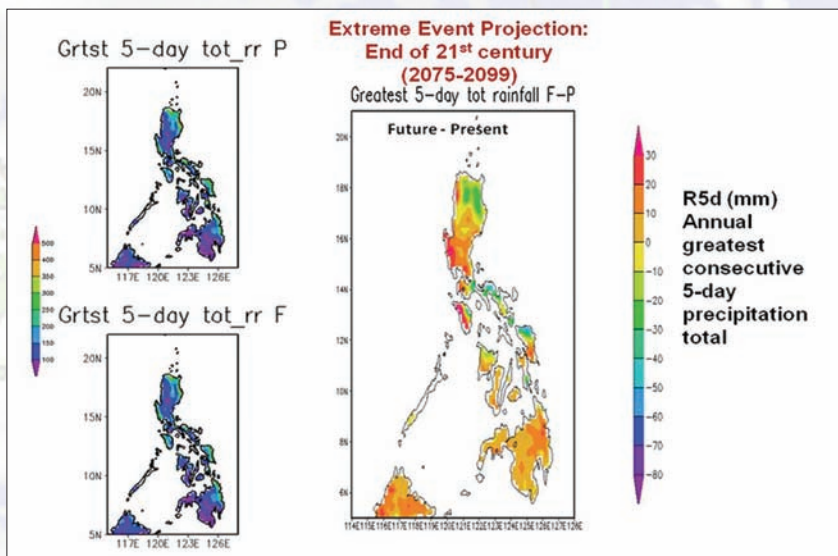
Akio Kitoh, Shoji Kusunoki, Yasuo Sato, Nazlee Ferdousi, Mizanur Rahman, Erwin Makmur, Ana Liza Solis, Winai Chaowiwat and Tran Dinh Trong

The super high-resolution (20km) AGCM has been made possible the simulation of present and future (at the end of 21st century) climate over the Philippines, with characterization of complex land-sea contrast and mountain ranges. The reliability of the model in representing the present-day climatological features of the Philippine monsoon is crucial for building confidence in future projections of the country's climate.

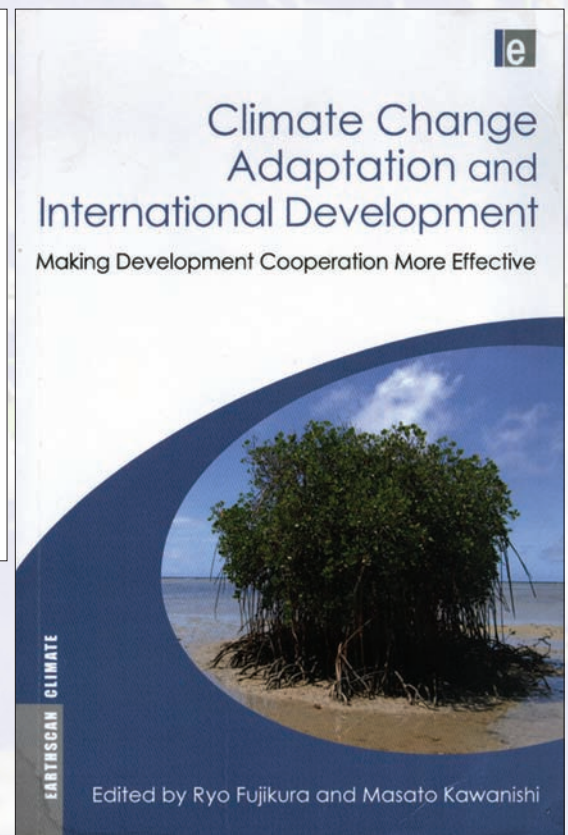
Rainfall is realistically simulated by the 20km MRI model, especially the detailed orographic rainfall in all seasons, but with slight overestimation during the Southwest Monsoon July-August-September (JAS) season. The model shows some weak points in the representation of inter-annual extremes, which either relate to tropical cyclone occurrence and their tracks during the peak typhoon months or may have some fragile relation with the cumulus parameterization scheme.

Particularly in the Western North Pacific region, it is important to thoroughly understand changes in tropical cyclones in order to recognize the country's increased risk potential from natural disasters and to take effective countermeasures.

Precipitation change (F-P)/P %; (2) precipitation extremes (annual greatest consecutive 5-day precipitation total)



Developing High Resolution Climate Change Scenario for the Philippines for the 21st Century



Future Changes of Temperature and Precipitation Extremes in the Philippines as derived from PRECIS Climate Modelling System



Downscaling of Seasonal Rainfall over the Philippines: Dynamical versus Statistical Approaches

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VINCENT MORON

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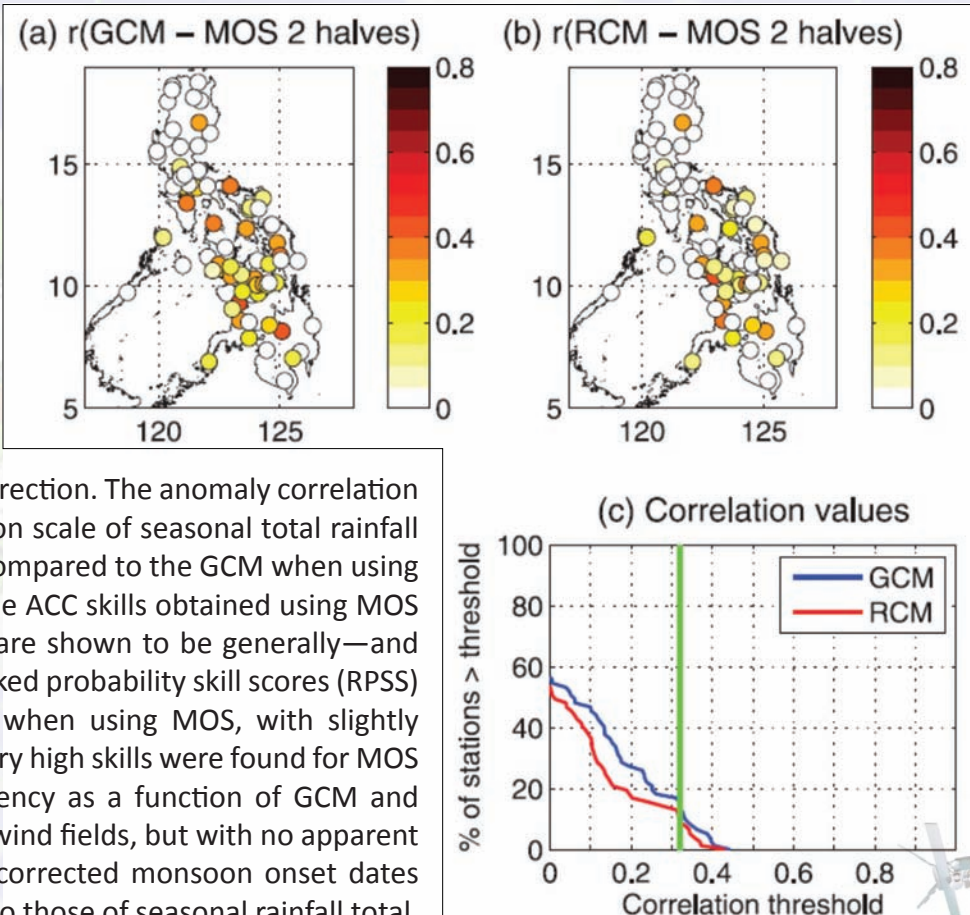
ANTHONY LUCERO

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(Manuscript received 19 July 2011, in final form 1 November 2011)

ABSTRACT

The additional value derived from a regional climate model (RCM) nested within general circulation model (GCM) seasonal simulations, over and above statistical methods of downscaling, is compared over the Philippines for the April–June monsoon transition season. Spatial interpolation of RCM and GCM gridbox values to station locations is compared with

model output statistics (MOS) correction. The anomaly correlation coefficient (ACC) skill at the station scale of seasonal total rainfall is somewhat higher in the RCM compared to the GCM when using spatial interpolation. However, the ACC skills obtained using MOS of the GCM or RCM wind fields are shown to be generally—and rather equally—superior. The ranked probability skill scores (RPSS) are also generally much higher when using MOS, with slightly higher scores in the GCM case. Very high skills were found for MOS correction of daily rainfall frequency as a function of GCM and RCM seasonal-average low-level wind fields, but with no apparent advantage from the RCM. MOS-corrected monsoon onset dates often showed skill values similar to those of seasonal rainfall total, with good skill over the central Philippines. Finally, it is shown that the MOS skills decrease markedly and become inferior to those of spatial interpolation when the length of the 28-yr training set is halved. The results may be region dependent, and the excellent station data coverage and strong impact of ENSO on the Philippines may be factors contributing to the good MOS performance when using the full-length dataset over the Philippines.



Climate Change Scenarios in the Philippines Using PRECIS

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ABSTRACT

Future changes in temperature and precipitation over the Philippines has been simulated based on a regional climate model known as PRECIS developed at the UK Met Office Hadley Centre for Climate Prediction and Research. The regional climate model used for this study is the Hadley Centre model HadCM3Q, with horizontal resolution 0.220 x 0.220 (25 x 25 km). PRECIS is used to simulate the baseline (1971-2000) climate for evaluation of model's capacity of reproducing present climate and analyze the future climate change responses over the Philippines for two time-slices centered on 2020 (2006-2038) and 2050 (2039-2065) based on A1B scenario.

The results obtained indicate significant variability in observed rainfall over the study region. While the rainfall did not show significant correlation there is evidence of increased variability of rainfall both in time and space. On the other hand mean, maximum and minimum temperatures exhibit increasing trends and this shows that the results for temperature trends over the Philippines concur with those of the IPCC reports which indicate increasing trend in temperatures both on global and regional scales.

Climate change projection of temperature indicated that, both minimum and maximum temperature will exhibit increasing trends in 2020 and 2050 in relation to A1B scenario. The model results indicate that significant warming will occur in the middle of the next century in the Philippines, with the largest warming occurring in June-July-August (JJA) and March-April-May (MAM) over Mindanao. Under the A1B scenario the projected mean annual temperatures in the Philippines are expected to rise by about 0.9°C to 1.1°C for 2020 and 1.9 °C to 2.2 °C by 2050. Likewise estimated changes in temperature are likely in all parts of the country by 2020 and 2050. The model

projected a change in annual rainfall between the range of 2% to 17 % by 2020 and 1% to 16 % by 2050. Meanwhile projection of seasonal temporal rainfall variation is lesser (-0.5 % to 25%) during the seasons of December-January-February (DJF) and September-October-November (SON).

The drier seasons of March to May will become drier still in most parts of the country in 2020 and 2050. Likewise the wetter seasons of June to August and September to November will become wetter in Luzon and Visayas in 2020 and 2050. The model indicated that anthropogenic climate change will probably lead to an active southwest monsoon in Luzon and Visayas as evident in future increases in rainfall which is more pronounced in JJA and becoming greater with time.

Figure 1: Observed Mean Temperature Anomalies in the Philippines (1951-2010) Departures from 1971-2000 normal values. An increase of 0.65°C from 1951-2010 (60 years)

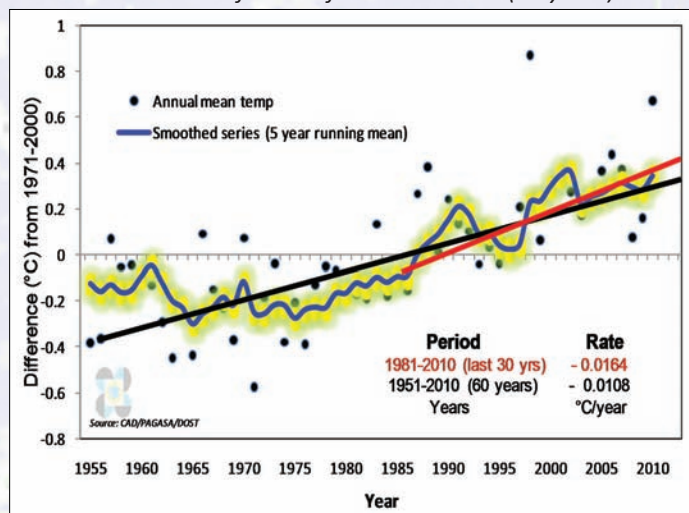


Figure 2: Maps showing the projected seasonal temperature increase (in °C) in the Philippines in 2020 and 2050.

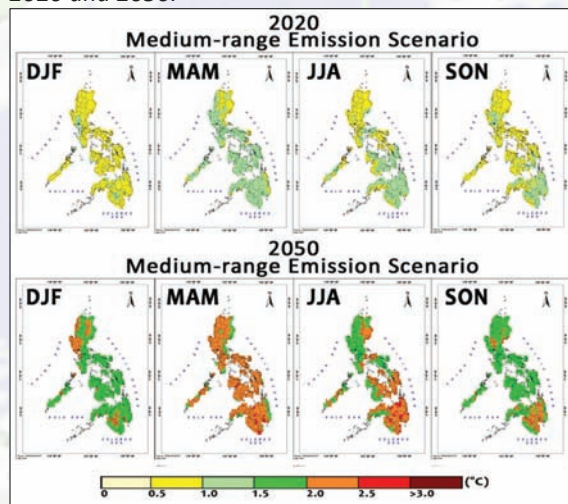
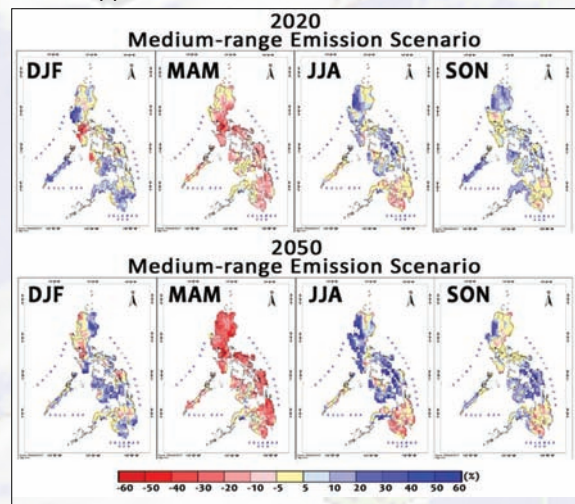


Figure 3: Maps showing the projected rainfall change increase/decrease in % in 2020 and 2050 in the Philippines.



Completed Projects

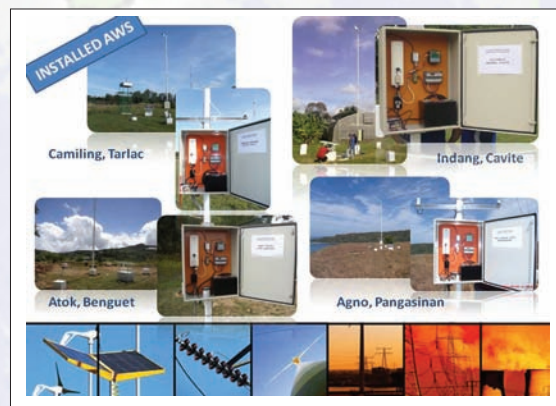
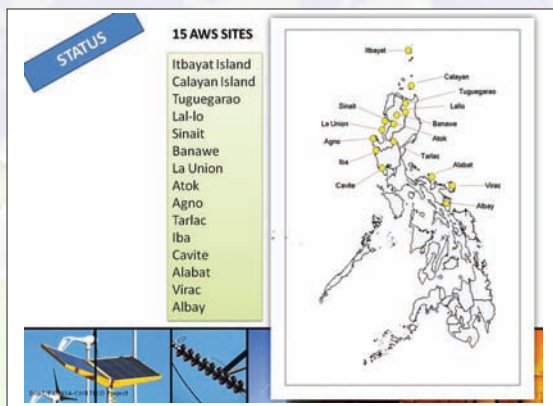
The completed projects being implemented and monitored by the agency are the following:

Strengthening of Surface-based Monitoring Network in Support of Scientific Research and Disaster Mitigation in the Philippines - 2010-2011

The installation of fifteen (15) Automatic Weather Stations (AWS) was funded by the National Science Council of Taiwan thru Taipei Economic Cultural office (TECO) and supported by Central Weather Bureau (CWB).

The installation of 15 Automatic Weather Stations (AWSs) at selected sites nationwide, augmented the present number of AWS of PAGASA to provide automated collection of meteorological data from remote areas. The establishment of communication link was also addressed under the project as well as the gaps in surface-based

meteorological information that are vital in understanding the unusual weather and climate conditions frequently observed. Sharing of data with the Central Weather Bureau, host regional, provincial and local government users including private, public schools and private agencies was one of the objectives of the project.



Provision of risk information for sustainable livelihood in the Agriculture sector in the Philippines- FAO

The Agricultural sector has heavily impacted by the weather-related risks. The El Niño Southern Oscillation (ENSO) phenomenon is the greatest driver of climate variability in the Philippines. Rainfall anomalies in terms of percentiles could drop to as low as <10 during an El Niño, indicating severe drought, or could go up to >80 during a La Niña causing floods (ADPC, 2000). The project's long-term development objective is to reduce vulnerabilities to climate, market and financial risks to ensure sustainable livelihoods in the agricultural sector. The project will develop capacities within PAGASA to enhance climate early warning through the generation and delivery of medium range forecasts, in addition to the seasonal climate forecasts it now generates and delivers, for reducing climate risks in the agriculture

sector. Another component includes the delivery of market information for essential agricultural commodities ahead of the season in demonstration sites to better manage market risks. The project will also facilitate the communities' identification and adoption of an appropriate financial instrument for managing financial risks. Finally, the project will demonstrate the application of climate (medium- and extended-range and seasonal forecasts) and market information, supported by an appropriate financial instrument, for disaster risk management in the agriculture sector.





Strengthening of Flood Forecasting and Warning System (FFWS) in the Pampanga and Agno River Basins - JICA



Upgrading of the Flood Forecasting and Warning System (FFWS) to provide timely and accurate flood forecasts and warnings was made through the rehabilitation of telemetering system, rainfall and water level monitoring equipment, restoration of the computer system and supply of spare parts and O&M equipment. It aims to minimize flood-related disasters in Pampanga and Agno river basins. The project was fully completed with the inauguration of the improved Agno River Flood Forecasting and Warning System and Sub-Center held at ARFFWC Compound, Tomana West, Rosales, Pangasinan. President Benigno Simeon Aquino III led the inauguration of the upgraded Agno River Basin Flood Forecasting and Warning System (PRBFFWS), an early warning facility for the provision of timely and reliable flood warnings in the province of Pangasinan on April 08, 2011.





The inauguration activity included the cutting of ceremonial ribbon, tour of the ARFFWC Sub-center and facilities, briefing on how the system works and coordination among concerned agencies. Should the President also wish to make a call to the Operation Center of the Office of Civil Defense in Manila or other agencies involved in flood forecasting and warning such as the National Power Corporation, National Irrigation Administration and DPWH, he can utilize the dedicated telephone lines for FFWS.

The Flood Forecasting and Warning System (FFWS) in the Philippines (specifically for the Agno River Basin) was established in 1983 with the financial and technical assistance from the Government of Japan. It aims to mitigate the losses from recurrent floods in the Agno River Basin through provision of bulletins/warnings to the communities threatened by flooding.

The Agno River FFWS is composed of a network of fully automatic rainfall and water level gauging stations, and a repeater station in Sto. Tomas, Baguio City. Data from the gauging stations are being transmitted by telemetry system to the Agno River Center in Tomana, Rosales, Pangasinan and to the monitoring stations of PAGASA and the OCD (both in Quezon City) and DPWH (Manila).

The Agno River Center has a telemetering supervisory equipment, control console, data display panel and teleprinter for the supervision and control of all the gauging stations in the basin. A multiplex radio link is also provided under the system. The Agno River Center is linked with the Science Garden radio station using an 800 MHz/70 watt output power with 12-channel capacity.

After almost 30 years of continuous operation, the environmental and social changes that have occurred in Regions 1 and 3 contributed much to the degradation and non-operational condition of the stations. Furthermore, most if not all of the equipment and facilities of FFWS have already surpassed their intended lifespan, making maintenance both a challenge and a feat for PAGASA. It is for these reasons that the PAGASA has proposed for the improvement of the FFWS in the Pampanga and Agno River Basins under the Grant Aid Program of the Government of Japan. The project would entail not only the replacement of existing and outmoded FFWS facilities and equipment but also the installation of additional monitoring stations and telecommunication towers which are vital to the whole FFWS.

The completion of the Project has resulted on the effective use of hydrological data and information for the provision of timely and reliable flood warnings to mitigate flood damages, and prevent loss of human lives. In addition, the data and information derived from the Project can also be utilized to provide climate outlook and advisories for development planning purposes.

Establishment of Doppler Weather Radar Network to Support Socio-economic Development in Mindanao – OP-Calamity fund

The establishment of Doppler radar stations at Tampakan, South Cotabato and Agusan provinces aims to provide real-time data and information needed to formulate short range forecasts/nowcasts and early warnings of weather-related hazards and disasters for the benefit of the transportation (land, aviation and marine), communication, agriculture, aquaculture and fisheries sectors as well as decision makers and community planners among others.





Climate Based Information Support System for the Management of the Angat-Umiray Reservoir – MWSS funded

A two year inter-agency project with an estimated cost of P4.36M was sourced by MWSS from the contributions of the two Concessionaires (MWCI & MAYNILAD) with PAGASA as the implementing agency. The duration of the project was from July 2008 to June 2010 but was extended until December 2011.



The main objective of the project is to develop an operational system capable of translating and interpreting climatological and hydrological information coming from local and international sources into an easily understandable and usable form to serve as an input in the decision-making processes in water resource management.

Project Activities:

- Enhanced the Angat-Umiray rainfall/inflow observing network through acquisition and installation of two Automatic Weather Station (AWS), computers and softwares.
- Developed prediction models for the target area based on global climate forecasts.
- Developed a computer-based decision support system.

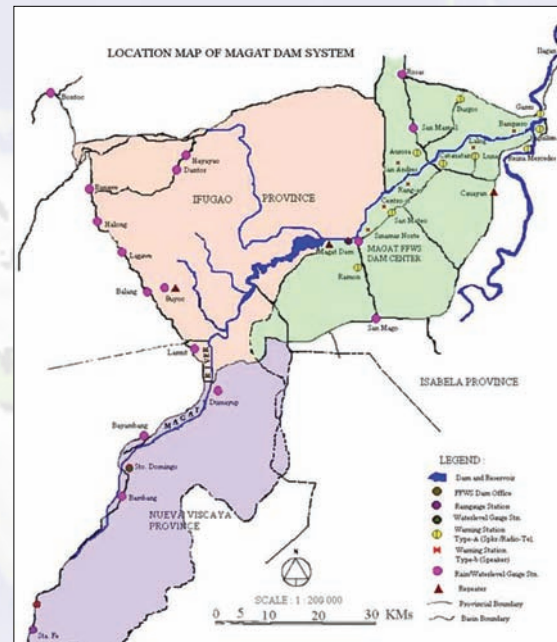


On-going Projects

Foreign-Assisted projects

Improvement of Flood Forecasting and Warning System for Magat Dam and Downstream Communities - Norwegian funding

To sustain the effective operation of the monitored major reservoirs in Angat, Pantabangan, Binga/Ambuklao/San Roque complex and Magat, this project was proposed to upgrade the existing facilities for flood forecasting and warning. With an upgraded system, flood forecasts will be improved and loss of lives and damage to properties will be minimized in communities downstream of the dams.



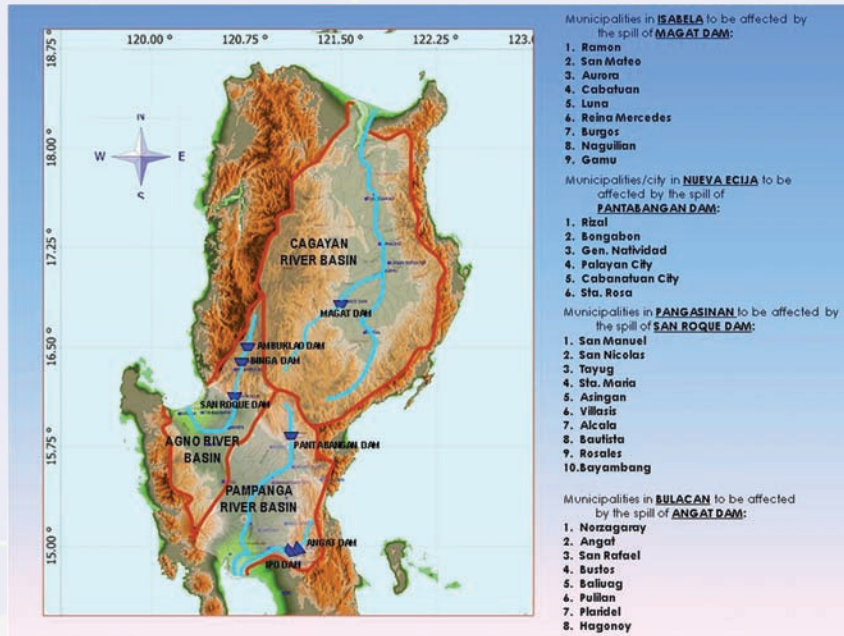
Strengthening of Flood Forecasting and Warning System for Dam Operation (FFWSDO) - JICA -TCP 2010-2012

The Flood Forecasting and Warning System for Dam Operation (FFWSDO) aims at the establishment of telemetered flood forecasting warning system that will provide the necessary information for the safe and cost effective operation of the existing five major dams in Luzon and to forewarn the people in the flood plains downstream of these damsites of the impending release of impounded water through spillways during typhoons. Phase I, involves the establishment of a FFWS covering Angat and Pantabangan watershed areas, while Phase II, involves the establishment of a FFWS covering Magat and Binga/Ambuklao watershed areas.

The Agencies directly involved in the implementation of the project such as National Power Corporation (NPC) and National Irrigation Administration (NIA) are dam authorities who operate and manage the Angat and Binga/Ambuklao Dams and Pantabangan and Magat Dams respectively and the PAGASA-DOST through its HydroMeteorology Division which operates the flood forecasting warning systems. Monitoring agencies are the Department of Public Works and Highways (DPWH), Office of Civil Defense (OCD) and the National Water Resource Board (NWRB).

The project will result in the effective use of the hydrological data and information for the efficient operations and management of reservoirs and ensure the optimum use of the impounded water for power generation, irrigation, flood control and domestic water supply, the mitigation of flood damages, particularly loss of human lives, by timely and adequate warnings of impending release of impounded water through the spillways.





Conducted Mid-term Review on JICA TCP “Strengthening of Flood Forecasting Warning System for Dam Operation (FFWS-DO and site visit to Agno and Cagayan to meet PAGASA & concerned government agencies, February 15-19, 2011

The Mid-term review was jointly carried out by the Mid-term Review Team composed of the Japanese team namely: Mr. Hayato Nakamura, Project Formulation Adviser (Disaster Management) Poverty Reduction Section, JICA Philippine Office, Dr. Mahmood Ul Zaman Khan, Consultant, Soft Tech Consultants, Japan, Dr. Akihisa Okuda, Comprehensive River Management Expert, Advisor, DPWH, Mr. Kessy Reyes, Program Officer, JICA Philippine Office, with Mr. Motoki, and Mr. Azuma, consultant of the project in PAGASA, and from the Philippine side Engr. Nonilo Peña, Supervising Science Research Specialist, Department of Science and Technology, Philippine Council for Industry, Energy and Emerging Technology Research Development (DOST-PCIEERD), Ms. Nancy T. Lance, Senior Weather Specialist, Planning Unit, PAGASA and Mr. Ryan Christopher Viado, Science Research Specialist, DOST-PCIEERD.



The purpose of the Joint Mid-term Review are: 1) to review the current status of the project progress based on the inputs, outputs, project purpose and identify the problems negatively affecting the project implantation 2) to evaluate the project in accordance with the five evaluation criteria namely, relevance effectiveness, efficiency, impact and sustainability and 3) to consider necessary actions to be taken and make recommendations for the project.



The review was conducted on the dam site (Ambuklao, Binga, San Roque, and Magat) including site visit to Tuguegarao Sub Center and Agno Sub center under the project entitled “Strengthening of Flood Forecasting and Warning System of Pampanga and Agno river basin” and “Strengthening of Flood Forecasting and Warning System for Dam Operation” projects under the JICA and TCP funding. Among the activities that were undertaken during the period from February 15 to February 19, 2011 were as follows:

1. Interview of personnel responsibilities/functions, and experiences under the implementation of the project;
2. Identification of the site on the dam where to install the equipment under the FFWSDO project such as sensor, water level gauge and staff gauge; and
3. Meeting with the JICA counterpart (NIA and NPC personnel).

Strengthening of Flood Forecasting and Warning System (FFWS) in the Bicol River Basins

Upgrading of the flood forecasting and warning system (FFWS) in order to provide timely and accurate flood forecasts and warnings through rehabilitation of telemetering system, rainfall and water level monitoring equipment, restoration of the computer system and supply of spare parts and O&M equipment. It aims to minimize flood-related disasters in Bicol river basins.

Establishment of Early Warning and Response System for Disaster Mitigation in Metro Manila. KOICA

- Establishment of an early warning and response system within the Marikina-Pasig River Basin.
- Provision of scientific and automated method for gauging the rainfall at the Pasig-Marikina River Basin and monitoring water levels at the selected points along the river basin which can help in the forecasting of the river’s water level. One of the output of the project is support from the local government units LGUs to operate, manage and maintain the Early Warning & Monitoring System (EWMS) are obtained

Improvement of Meteorological Radar System in the Philippines – JICA

The project aims to upgrading the observational capacity of the radar network of PAGASA-DOST for monitoring of typhoons, monsoons and other weather disturbances and to improve the accuracy of forecast and timeliness of warnings to prevent loss of lives and damage to property. It involves the acquisition and installation of equipment and facilities for three (3) Doppler radar systems, replacing the existing radars namely Guiuan, Virac and Aparri. The project also involves activities for the enhancement capacities of weather forecasters such as trainings, improvement of forecasting techniques for rainfall, flashfloods and landslides; establishment of data management systems; and strengthening of warning dissemination and communication to improve the PAGASA-DOST forecasting and warning systems.

MDGF 1656: Strengthening the Philippines Institutional Capacity to Adapt to Climate Change – Spanish grant & UNDP

This joint programme will:

1. Determine vulnerability of critical sectors of the Philippines to climate change;
2. Strengthen the country’s adaptive capacity by enhancing the planning, programming and implementation capacities of key stakeholders; and
3. Undertake five (5) adaptation demonstration projects to develop / test systems for potential upscaling and replication.

Overall, the project has contributed to the enhancement of competencies of PAGASA in terms of infrastructure and human resource. As a result of the training, PAGASA enhanced its capacity to generate high resolution regional climate projections using other downscaling techniques (CCAM) and models. Furthermore, with the acquisition of the cluster computing facilities running time to





run the models was cut from 10 months to 2 months. PAGASA has enhanced its capacity to develop detailed regional climate information from data that developed countries, such as the UK, CSIRO are equipped to supply.

Climate scenarios generated by PAGASA in 43 ++ provinces in 2020 and 2050 have been widely used in the planning activities of national government agencies (NGAs). PAGASA has participated in various fora on application of the climate scenarios in climate proofing plans and programs of various NGAs and LGUs.

The training of trainers' has proven to be an effective means to introduce and strengthen the knowledge of PAGASA personnel in the field stations in climate change and scenario analysis and enable them to understand how to generate climate scenarios. The pool of trainees would also be more accessible to provide orientation/briefing to their constituents. The programme was able to develop a common platform of knowledge into training materials that could then be adapted to local condition by trainers. Trainers can make presentation more local-appropriate by adding local climate data and local experience.

The automatic weather stations installed in the four project sites have benefitted local government units in monitoring rainfall which can be translated as early warning system for the community.

The application of the AWS is already used in the weather-based insurance index being implemented by International Labor Organization (ILO) and Philippine Crop Insurance Corporation (PCIC). Certified daily rainfall from the AWS, will be used by PCIC in case of monitored breach of index (es), or there is potential for payouts for claims.

Philippine Climate Change Adaptation DA/DENR/PAGASA Philippine Climate Change Adaptation Project-Phase 1 (PhilCCAP-1)/World Bank

This project is aimed to develop and demonstrate the systematic diagnosis of climate-related problems and the design and implementation of cost-effective adaptation measures in agriculture and natural resources management. It, therefore, supports activities for competitive and sustainable agriculture and fisheries sector. It is implemented by the Department of Agriculture, Department of Environment and Natural Resources, and the Philippine Atmospheric, Geophysical and Astronomical Services Administration, in cooperation with the World Bank. It has four major components:

- a: Strengthening the enabling environment for climate change adaptation;
- b: Demonstrating climate change adaptation strategies in the agriculture and natural resources sectors;
- c: Enhance provision of scientific information for climate risk management; and
- d: Project coordination.

The role of the PAGASA in the project is focused on the third component – enhance provision of scientific information for climate risk management. The primary objectives of this component are:

- a: to improve the access of end users, especially in the agriculture and natural resources sectors; and
- b: to provide more reliable scientific information to enable fast and accurate decision-making to safeguard against the impact of climate change that could affect productivity.

One of the expected outputs of the project is an enhanced national and local capacity to develop, manage and administer projects addressing climate change risks. This would provide capacity building for PAGASA. A number of its personnel will undergo specialized training on localization of available circulation models to generate the climate risk scenarios. Some personnel will also undergo training on flood and typhoon forecasting to upgrade the quality of climate information issued to the public and other end users.

PAGASA acquired through the project four Automatic Weather Stations (AWS) for operations in Albay, Ifugao, Sorsogon and Agusan del Norte. These additional pieces of hardware for data acquisition would help improve weather and climate data analyses.





Applying Remote Sensing Technology in River Basin Management JAXA /ADB Technical Assistance project

The Asian Development Bank (ADB), in collaboration with Japan Aerospace Exploration Agency (JAXA), is formulating a regional capacity development technical assistance (TA) to support countries in Asia and the Pacific, apply space based technologies (SBT), and information communication technology (ICT) for improved river basin management. Country level interest has been explored through ADB's existing sector partnership with the member countries, and the Philippines has been identified as pilot country for the following reasons:

- The Philippines remains one of the most water-related disaster prone countries from 1988 to 2008, where the number of people perished from water-related disaster is the fifth largest among the developing member countries;
- Mitigating natural disaster is stressed in its Country Operations' Business Plan (COBP); and
- The Philippines has strong ownership in developing structural; and non-structural measures to mitigate water-related disasters.

Satellite based rainfall data called Global Satellite Mapping for Precipitation (GSMaP) will be utilized to interpolate the ground based rainfall observation and apply the calibrated data to improve the quality of flood forecasting and/or prediction.

Locally-Funded projects

DOST-ASTI-PAGASA Automated Weather Station (AWS)- Automatic Rain Gauge (ARG) project

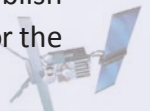
The PAGASA-DOST, in line with its modernization program, is presently embarking on the establishment of Automatic Weather Stations (AWSs) nationwide. The establishment of AWSs is in coordination with the Advanced Science and Technology Institute (ASTI)-DOST. The ASTI-DOST has developed various instruments such as AWS to assist PAGASA in weather monitoring and forecasting.

PAGASA-DOST, in addition to the Doppler radar installation project, needs the AWSs to automate its ground stations in order to perform faster, more accurately and efficiently in the areas throughout the country which will primarily serve as early warning and monitoring devices for disaster mitigation.

The automation of data acquisition and transmission will decrease operational cost and minimize possibility of errors through the use of manual instruments. The PAGASA/ASTI- AWS joint project will establish and maintain a nationwide environmental monitoring network and will continuously provide solutions for the mitigation of environment-related disasters.

The AWSs are equipped with sensors capable of measuring weather parameters, wind speed and direction, air temperature, air humidity, air pressure, rain amount, duration and intensity. A total of 80 AWSs were deployed in stations across the country for the year.

In addition to the AWSs, ASTI, in cooperation with PAGASA, has also developed





an Automatic Rain Gauge (ARG) to gather and record the amount of rainfall over a set period of time and automatically sends the data to the central based station on a pre-determined interval basis. The ARGs are equipped with ASTI-developed data logger platform GSM Data Acquisition Terminal (GDAT) which serves as mini-computer that controls the functions and data communications of the station. A total of 100 ARGs have been deployed nationwide.

The project aims to develop locally developed instrument for weather monitoring and forecasting and to develop cost-effective platforms and applications for real-time data gathering of environmental parameters.

In line with this initiative a press conference was conducted. The press conference was held at Amihan conference room on June 30, 2011, presided by the DOST Secretary, Hon. Mario G. Montejo. Dr. Nathaniel T. Servando, Acting Administrator of PAGASA delivered the welcome remarks. Dr. Denis F. Villorente gave a brief description of the project and the technical aspect of the AWS. He discussed the goal of the project to complement projects meant to enhance the government capability in environmental monitoring and to develop related applications by providing technology that will enhance capabilities, observation, collection, and transmission of environmental data. Dr. Servando talked on the applications of the AWS and usefulness of the data. He added that data collection will be enhanced and improve the capability in weather monitoring, provision of more frequent weather and typhoon information and advisories to areas at risk.

Natural Disaster Preparedness and Mitigation Services

In accordance with its mandate and in the pursuit of its mission, PAGASA is always at the forefront together with other concerned agencies in formulating strategies to combat the effects of natural calamities. One proven strategy is the vigorous information and education campaign being pushed by the agency to promote awareness on natural hazards. PAGASA regularly conducts lectures on the different hazards its effects and characteristics. The STRIDE (Special Tropical Weather Disturbance Reconnaissance, Information Dissemination and Damage Evaluation) Team, a quick response group of the Agency that performs activities explicitly expressed by the group's name, conducted field investigation and extended assistance in the mitigation of meteorological hazards and disaster reduction in areas affected by land falling tropical cyclone, tornadoes, store surge, etc.

Information, Education and Communication (IEC) Campaign

A continuing activity of the agency is aimed at increasing public awareness on natural hazards for proper implementation of appropriate mitigation measures. The main component of the IEC program is the consistent participation of its personnel as resource persons in seminars, workshops, training, fora, and other public gathering organized by LGUs, NGOs and other disaster-oriented organizations on related topics such as hydro-meteorological hazards, climate change, El Niño, La Niña, the agency's role in S&T and disaster preparedness and mitigation. Some 38,449 participants attended the different fora conducted in Metro Manila and in some provinces. These activities have brought PAGASA closer to the public and likewise enhanced the participants' level of awareness on disaster reduction. Likewise, a total of 17,890 information materials such as pamphlets, maps, posters and brochures were distributed to the public to help sustain the agency's IEC campaign. Strengthening ties with the media continues in support for a wider dissemination of information.



ANNUAL S&T CELEBRATIONS

61st World Meteorological Day & 146th National Meteorological Day,
March 23, 2011



TYPHOON AND FLOOD AWARENESS WEEK

June 20 - 24, 2011



HUMAN RESOURCE DEVELOPMENT

The Agency continues to develop its manpower resource to provide an adequate pool of highly qualified and well-trained scientists, technical and administrative personnel for effective and efficient delivery of S & T services.

Scholarships

During the year, PAGASA Scholarship program continued which aims to provide higher education and training opportunities to its staff. Of these, 6 are pursuing Master's Degree Program at the University of the Philippines including 3 foreign fellows. The grant of fellowship to foreign nationals is a commitment of the Philippine Government to the WMO Voluntary Cooperation Program (VCP), as a member of the WMO.

2 0 1 1 G R A D U A T E S				
PHILIPPINES	Zin Mie Mie Sein	Myanmar	University of the Philippines	M. Sc. Met
	Nikos Victor Peñaranda	Philippines	University of the Philippines	M. Sc. Met
	Adelaida Castillo	Philippines	Ateneo de Manila University	MS Atmospheric Science
	Maria Ana Glaiza Escullar	Philippines	Ateneo de Manila University	MS Atmospheric Science
	Raymundo Ordinario	Philippines	Ateneo de Manila University	MS Atmospheric Science
	Ariel Zamudio	Philippines	Ateneo de Manila University	MS Atmospheric Science
AUSTRALIA	Socrates Paat, Jr.	Philippines	The University of New South Wales	Master of Science and Technology in Spatial Information
	Sheila Schneider	Philippines	The University of New South Wales	Master of Science and Technology in Spatial Information
	Christopher Perez	Philippines	The Australian National University	Master of Climate Change
	Maria Cristina Uson	Philippines	The University of Sydney	Master of Applied Science in Spatial Information Science
	Analiza Solis	Philippines	The Australian National University	Master of Climate Change



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RAYMOND C. ORDINARIO



ARIEL R. ZAMUDIO

MASTER OF CLIMATE CHANGE



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Australian National University



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Capacity Building

To further enhance the skills and upgrade the capabilities of its personnel in effectively carrying out its function, 8 specialized in-house training courses were conducted by the agency for a total of 239 PAGASA participants. Table 1 lists in-house training courses conducted by the agency. The courses range from weather observation, weather forecasting and other related phenomena, software development and values orientation. To establish essential linkages within the scientific community and other organization as well as promote exchanges of scientific and technical knowledge for improving and upgrading agency services, a total of 228 personnel attended local trainings and seminars while 99 officials and employees participated in international trainings and conferences. Table 2-4 list various training, seminars and conferences attended by PAGASSA officials and employees here and abroad.

Table 1. In-house training conducted by PAGASA

Training Courses	Inclusive Dates of Training	No. of Participants
Refresher Course on Meteorological Observations, Practices and Procedures for Field Station Personnel - Mindanao-PAGASA Regional Services Division (Min-PRSD) - Northern Luzon -PAGASA Regional Services Division PRSD-NLPRSD	January 14-16 January 28-30	27 participants 19 participants
Seminar on Objective Forecasting of Maximum and Minimum Temperatures	February 23-24	29 participants
JOOMLA! Basic Training	April 11-15	11 participants
Orientation Workshop on Weather Observation Protocol Project of PAGASA for DOST Regional Directors	April 7	16 participants
Technical Training on Automatic Weather Station (AWS)	June 6-7	31 participants
Meteorological Technicians Training Course	August 2011	34 participants
Meteorological Training Course	started November 2011	37 participants
Seminar on Government Radio Operator's Certification (GROC) for the Southern Luzon PAGASA Regional Services Administration	August 10-13	11 participants
Seminar of Government Radio Operators Certification (GROC) for the Visayas PAGASA Regional Services Division, Cebu Business Hotel, Cebu City	October 5-8	25 participants
Seminar of Government Radio Operators Certification (GROC) for the Mindanao PAGASA Regional Services Division, Davao Crown Regency Residence	October 11-15	26 participants
WMO Workshop on Human Resources Management of NMHSs for Asia (RA II) and South West Pacific (RA V) Countries at Crowne Plaza Manila Galleria	Oct. 17-21	32 participants
Training on Microcontroller-Based System Design and Development, WFFC	Dec. 6-9	14 participants





Refresher Course on Meteorological Observations, Practices and Procedures for Field Station Personnel



Meteorological Training Course



Meteorological Technicians Training Course



Seminar of Government Radio Operators Certification (GROC) for the Visayas PAGASA Regional Services Division



**Table 2. Local training/seminar/conference attended by PAGASA personnel**

Name	Title	Date and Venue
Danilo F. Cambay Diosdado S. Ornum Rogelio T. Bagadiong Feliciano M. Tan	Supervision of the Installation, Site Acceptance Test and On-site Training of the Single Pol S-band Doppler Weather Radar System for Hinatuan	From 20 January 2011 and onwards (S.O.041 did not specify the date of the OJT) Hinatuan
Cesar V. Datoc Gerino Q. Prenda, Jr. Jerry F. Muñoz Celso A. Amadore	On-Site Training of the Single Pol S-band Doppler Weather Radar System for Hinatuan	From 20 January 2011 and onwards (S.O.041 did not specify the date of the OJT) Hinatuan
Edwin F. Manresa Fulgencio A. Austria, Jr. Willy F. Evangelista	Site Acceptance Test of the Single Pol S-band Doppler Weather Radar System for Hinatuan	From 20 January 2011 and onwards (S.O.041 did not specify the date of the OJT) Hinatuan
Fredolina D. Baldonado Angelina S. Galang	Practical Management in Global Market (Day) Course	24 Jan – 05 Feb Legaspi Village, Makati
Cynthia P. Celebre Vicente B. Malano Edna L. Juanillo	Philippines-Vietnam 6 th Joint permanent Working Group Meeting on maritime and Ocean Concerns	24 – 25 Jan Pan Pacific Hotel
Claro Jesus M. Capulong Marcos P. Bacani	Technical Training/Workshop on 2011 Philippine IPv6 Conference and Training	25 – 27 Jan Shangrila, Makati City
Norma D. C. Moya Yolanda P. Ordoñez Adelaida P. Gonzales Jose Daniel C. Suarez	Annual Consultative Assembly of DOST Financial and Administrative Officers for 2011	03 – 04 Feb DOST Lounge, Bicutan, Tagig City
Cynthia P. Celebre Esperanza O. Cayanan Catalino L. Davis Susan R. Espinueva Vivian S. Esquivel Calil J. Hadjilatip Flaviana D. Hilario Edna L. Juanillo Carina G. Lao Nancy T. Lance Anthony Joseph R. Lucero Marino L. Mendoza Ma. Cecilia C. Monteverde Nestor B. Nimes Edino Nonato L. Nolasco Bonifacio G. Pajuelas Romeo M. Pelagio Robert Z. Quinto Ninio A. Relox Nathaniel T. Servando Lourdes P. Sulapat Ma. Elena V. Tan	75 th General Assembly Meeting of the National Research Council of the Philippines (NRCP)	09 Mar Manila Hotel
Heraclio M. Borja, Jr.	Joint congressional Oversight Committee on Clean Water Act Meeting	01 Feb GSIS, Pasay City
Heraclio M. Borja, Jr.	Workshop for the Philippine Pilot Study of the International Atomic Energy Agency Water Availability Enhancement Project	02 – 03 Mar PNRI, QC
Gloria C. Cruz Araceli S. Arroyo Joel C. Rivera	Seminar workshop on Administrative Discipline	23 – 25 Feb QC
Judith T. Bomediano Ma. Christine Samantha V. Monfero	DOST Webmaster consortium Team Leaders Meeting	10 Feb ASTI, QC





Seminar of Government Radio Operators Certification (GROC) for the Mindanao PAGASA Regional Services Division



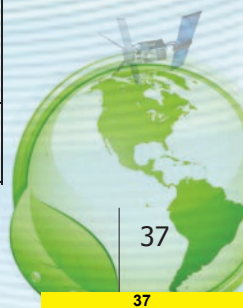
Orientation Workshop on Weather Observation Protocol Project of PAGASA for DOST Regional Directors



Broadcasting Orientation Workshop for PAGASA Forecasters

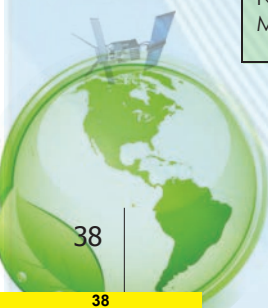


Name	Title	Date and Venue
Heraclio M. Boria, Jr.	Joint congressional Oversight Committee on Clean climate Change Adaptation in Local Development Planning and Decision-making Process Project	01 Feb MGB, QC
Susan R. Espinueva	Meeting of JBIC/AMEC Environmental Mission	04 Feb Pangasinan
Fredolina D. Baldonado	72 nd PICE National Convention	16 – 18 Feb Bacolod City
Karl Alexander P. Vasquez	Crash Course on <ul style="list-style-type: none"> - Postfix Mail System - Virtual LAN - Linux Virtualization - Linux Network Security - Linux Clustering (HPC & HA) - Apache HTTP Server 	18 – 19 Feb 24 Feb 28 Feb 21 – 23 Feb 25 – 26 Feb To be scheduled Blue Point institute of Higher Technology Foundation
Susan R. Espinueva Rosalie C. Pagulayan Nestor U. Flores	Public Information Drive and Drill on the Flood Forecasting and Warning System for the Downstream Communities of Caliraya and Botokan Dams	09 – 11 Mar Laguna
Judith T. Bomediano	DOST Webmasters Consortium Workshop	07 – 08 Mar ASTI
Maribel G. Enriquez	International Convention on Advocacy and Partnership on Biosafety and Biosecurity in the Philippines	16 – 18 Mar Dapitan City
Edino Nonato L. Nolasco Robert Z. Quinto	Seminar on Emergency Information and Communication Technologies	21 – 25 Mar Quezon City
Delia T. Basco Daisy F. Ortega Nestor B. Nimes Robert Z. Quinto	From Theory to Practice: A Forum on Geohazard	30 Mar PHILVOLCS
Edino Nonato L. Nolasco	ArcGIS Desktop 2 and 3 Training Modules	Desktop 2 – 06 – 08 April Desktop 3 – 23 – 24 May Pasig City
Felinda A. Tanda Imelda N. Tuazon	1 st Quarterly Membership Meeting and Seminar-Workshop of the PAGBA, Inc.	06 - 09 Apr Davao City
Hernando O. Pantoja	Rice Watch and Action Network Writeshop on Climate Field School Module	06 – 09 Apr San Mateo Rizal
Edna L. Juanillo	National Capability Building for Philippine Land Degradation Assessment and Climate Change Adaptation	18 – 20 Apr Pampanga
Nancy T. Lance Vivien S. Esquivel	NCR Cooperative Sector Conference on Climate Change	28 Apr UN, Manila
Araceli S. Arroyo Evangeline B. Asis	Seminar/Workshop on The 4 Competencies of Human Resource Practitioner	27 to 28 April QC
Nestor B. Nimes	Disaster Risk Reduction and Management Workshop in CALABARZON	24 to 26 Apr Laguna
Ralph Valtere V. Soquila	Training on CISCO 1, 2 and 3	TTh 6 -9 PM Apr – June Jul – Sept Oct – Dec MAPUA IT Center
Renato de Leon Meliton Pio Guzman	Seminar on Emergency Information and Communication Technologies	09 – 13 May QC





Name	Title	Date and Venue
Cynthia P. Celebre	37th PSTD National Convention	17 to 19 May Davao
Flaviana D. Hilario Cynthia P. Celebre Ma. Cecilia A. Monteverde Thelma A. Cinco Roy A. Badilla Adelaida C. Duran	GMMA Seminar Series: Supporting Risk Analysis for Flood and Tropical Cyclone (Severe Wind) and Exposure Database Development	02 to 04 May
Robert Z. Quinto Edino Nonato L. Nolasco Vicente C. Manalo III	Technical Workshop (Exposure Component)	05 to 06 May Both in Pasig City
Roy A. Badilla Adelaida C. Duran	Flood Component	
Nivagine C. Nievares Meliton Pio F. Guzman		
Flaviana D. Hilario Cynthia P. Celebre Ma. Cecilia A. Monteverde Thelma A. Cinco Lourdes R. Sulapat Analiza C. Tuddao Emma D. Ares Joel C. Jesusa Juanito S. Galang Rose S. Barba	Severe wind Component	
Vicente B. Malano Catalino L. Davis Lillibeth B. Gonzales Nancy T. Lance Landrico U. Dalida, Jr. Jori J. Loiz Aldczar D. Aurelio Sonny N. Pajarilla Nivagine C. Nievares Adelaida C. Duran Samuel F. Duran Marcelino Q. Villafuerte III Raymund Gerard L. Ordinario Bernard R. Punzalan II Ariel R. Zamudio	1st ACTS workshop	25 to 27 May Crown Regency Hotel, Cebu City
Romeo M. Cadag	Seminar on Appraisal and Disposal of Government Properties	25 to 27 May QC
Robert Z. Quinto Edino Nonato L. Nolasco Vicente C. Manalo III Roy A. Badilla Meliton Pio F. de Guzman	PDA RICS Training Workshop	07 – 08 June PHILVOCS
Flaviana D. Hilario Susan R. Espinueva Esperanza O. Cayanan Bonifacio G. Pajuelas Emma D. Ares Thelma A. Cinco Rosalina A. de Guzman Vivien S. Esquivel Ma. Cecilia A. Monteverde Nestor B. Nimes Marcelino Q. Villafuerte II	PAGASA and Resilient Seas Convergence Workshop	08 June UP Quezon City



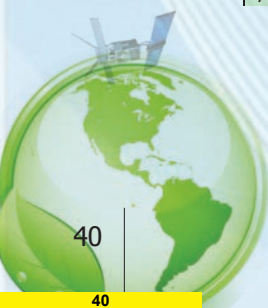


Name	Title	Date and Venue
Karl Alexander P. Vasquez Rolymer P. Canillo Fulgencio A. Austria, Jr. Marcos P. Bacani Andre Jude M. Jose Ralph Valtere V. Soquila	IPv6 for Beginners Training	09 – 10 June 13, 2011 ASTI
Edna L. Juanillo Vivien S. Esquivel	Orientation/Hand-on Training on Water Resource Statistics Information System and workshop of the TWG-WRS	15 to 17 June Manila
Claro Jesus M. Capulong	System Administration Demonstration and End-User Training	09 – 09 Jul ASTI
Robert Z. Quinto Vicente C. Mandalo III Meliton Pio F. Guzman Edino Nonato L. Nolasco Margarita E. Constantino Renely L. Basiño	Technical Working Group Workshop on Exposure Database Development for Greater Manila Area	04 to 08 Jul QC
Nancy T. Lance	Inter-Agency Task Force Writeshop on the Formulation of the National Disaster Risk Reduction and Management Plan	11 to 13 Jul Tagaytay City
Heraclio M. Borja, Jr. Hilton T. Hernando Rosalie C. Pagulayan Rommel P. Yutuc	Strengthening of Flood Forecasting and Warning System for Dam Operation	14 and 21 July Bulacan
Susan R. Espinueva	Stakeholders Consultation Meeting on the Flood Forecasting and Warning System of the Angat River Basin	14 Jul Bulacan
Sylvia N. Davis	Seminar/Workshop on conducting Administrative Investigation	04 – 05 Aug QC
Arnel R. Manos Mario I. Dungca Yolanda P. Ordoñez	Seminar on ICT Resources Acquisition	22 – 26 Aug QC
Remegia N. Borbon	Practical Project Mgt in Public Investment Course	31 Aug – 02 Sept Makati City
Remia D. Paulo	Practical Project Mgt in Global Market	05 – 17 Sept Makati City
Marilyn V. Medina	Developing a Road Map for Urban Sector Action synergized with the National Climate Change Action Plan	03 Oct Makati City
Jose Daniel C. Suarez Aurora DS, Somera	Orientation on PhilCAP Financial Mgt System and Fund Flows	05 – 07 Oct Antipolo City
Michelle V. Heruela	Annual national Convention cum Seminar of AGIA	12 – 14 Oct Puerto Princesa
Cynthia P. Celebre Dario L. dela Cruz Mario M. Raymundo Jose J. Mendoza IV Renato M. de Leon Edward R. Pangilinan	Sympo on Developing Astronomy Education and Research in the Philippines	20 Oct Laguna
Sylvia N. Davis	In-house Training on Administrative Rules and Procedures of Disciplinary Cases in the DOST System	20 Oct DOST
Adelaida P. Gonzales	3 day Competency-based Training on HRM in the Public Sector	25 to 27 Oct QC





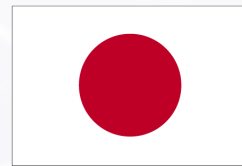
Name	Title	Date and Venue
Jan Ivy L. Bausa Eleonor Duque Ludwig Robles	Seminar on Property and Supply Management System with Updates on RA 9184 National/Local/Corporate	25 to 28 October QC
Nathaniel T. Servando	10 th National Career Executive Service Conference	09 – 11 Nov Zamboanga City
Edino Nonato L. Nolasco Analiza C. Tuddao	Geodata System Technologies, Inc training modules on Exploring ENVI	15 – 18 Nov Pasig City
Robert Z. Quinto Edino Nonato L. Nolasco Jose P. Mendoza IV Renato M. de Leon Meliton Pio F. Guzman Renely L. Basiño	Orientation of the Exposure Database Module Survey Tool	01 to 11 Nov Pasig City
Salvador S. Olinares	Care Team Building and Strategic Planning	05 Nov La Union
Cynthia P. Celebre Edna T. Seachon	Future Unlimited-Australian Higher Education Showcase 2011	15 Nov Makati City
Angelina S. Galang	Clerical-Secretarial Enhancement Course	22 Nov Manila
Nathaniel T. Servando Flaviana D. Hilario Rosalina A. de Guzman Roque E. Adora Recto Vidayo Jr Rodnie Oral	Philippine Media Conference on Climate Change Adaptation and Inauguration of Climate Change Academy of Albay	24 to 26 Nov Legazpi City
Thelma Cinco	Multi-Sectoral Consultation Workshop	01 – 02 Dec Pampanga
Edna Juanillo	Forum on the Sharing of Experiences on Climate Change Adaptation	05 Dec Legazpi City
Cynthia Celebre Nancy Lance Arceli Arroyo	M & E Workshop	07 to 09 Dec Pampanga
Vivien Esquivel Sharon Juliet Arruejo Jessica Tumaque	National Convention of Government Employees	08 Dec Manila
Rosalie Aguilar	Science Information Forum on Nutrition and Diet for a Healthy Lifestyle	08 Dec Pasay City
Chona Dionisio Evangeline Asis	Leaders Assembly and Planning Workshop	09 – 11 Dec Palawan
Felinda Tanda Ma. Joy Iglesias Ana Pangan	2012 Updates on Government Financial Accounts Administration	09 – 12 Dec Cebu City
Fredolina Baldonado	ISO 9001:2008 Awareness Seminar	12 Dec MIRDC
Bonifacio Pajuelas Edna Juanillo Arceli Arroyo	Mentoring Workshop for Supervisors	13 – 14 Dec Pasig City





INDONESIA





JAPAN

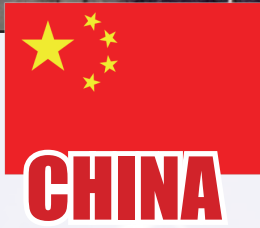




Table 3. FOREIGN FELLOWSHIPS / SCHOLARSHIPS ATTENDED (Meeting / Conference / Symposium / Activity / Forum / Session)

Name	Title	Date & Venue	Sponsor
Nathaniel T. Servando Margaret P. Bautista Mario F. Palafox	43 rd Session of the Typhoon Committee	17 to 22 Jan Jeju Island, Republic of Korea	PAGASA MDGF 1656 Project
Nathaniel T. Servando	Meeting with the different organizations in the USA (NOAA, NASA, Dept. of State, NSP, Phil. Embassy in Washington, EEC, Univ. of Oklahoma, Univ. of Colorado & Radcliffe Corporation	07 – 15 Mar USA	PAGASA
Edna L. Juanillo	<ul style="list-style-type: none"> • Training Course on Downscaling Techniques for the AWCI Climate Change Assessment and Adaptation (CCAA) Study • Global Terrestrial Network Hydrology Meeting • 7th Integrated Global Water Cycle Observation Meeting • 5th GEOSS Asia-Pacific Symposium 	11 – 12 Mar 13 Mar 14 – 15 Mar 16 – 18 Mar Japan	Hiroshima University of Japan under the APN project funds
Cynthia P. Celebre	5 th Global Earth Observation System of Systems (GEOSS) Asia Pacific Symposium	16 – 18 Mar Japan	GEOSS
Susan R. Espinueva	Working Meeting for Typhoon Committee (TC) Cross-Cutting Project of Urban Flood Risk Management (URFM)	04 – 05 Apr PROC	United Nations Economic and Social Commission for Asia and the Pacific
Flaviana D. Hilario Rosalina G. de Guzman	United Nations Framework Convention on Climate Change (UNFCCC)	03 – 08 April Thailand	PAGASA MDGF 1656 Project
Nathaniel T. Servando Flaviana D. Hilario	16 th World Meteorological Congress (Cg-XVI)	16 – 28 May – NTS 27 May – 03 June - FDH Switzerland	UNDP Millennium Development Goal Fund-1656 Project
Rosalie C. Pagulayan	Urban Flood Risk Management (UFRM) Good Practice City Visiting	18 – 20 May PROC	Airfare – WMO Accommodation and per diem – PAGASA
Nathaniel T. Servando Cynthia P. Celebre Ricardo A. Mercado Mario F. Palafox Arnel R. Manos	Asia Pacific Economic Cooperation (APEC) Typhoon Symposium (APTS)	10 – 14 April – NTS 10 – 14 Apr – CPC 10 -13 Apr – RAM 10 -13 Apr – MFP 10 -13 Apr – ARM	PAGASA APEC Research Center for Typhoon and Society
Margaret P. Bautista	Experts Meeting on Extended Hydrological Prediction Workshop	07 – 09 Jul Australia	WMO
Nathaniel T. Servando	33 rd Meeting of the ASEAN Sub-Committee on Meteorology and Geophysics (SCMG)	18 - 20 Oct Brunei Darrusalam	GIA Project
Edna L. Juanillo	World Climate Research Program (WCRP) Open Science Conference	24 – 28 Oct Colorado, USA	MDGF 1656 Project
Catalino L. Davis	3 rd Manila Economic and Cultural Office-Taipei Economic and Cultural Office (MECO-TECO)-Joint Science and Technology Commission Meeting (JSTC)	25 – 27 Oct Taiwan	PAGASA
Rosalina de Guzman	Asia-Pacific Climate Change Adaptation Forum 2011	27 – 28 Oct Thailand	ACC Bio Project





CZECH REPUBLIC





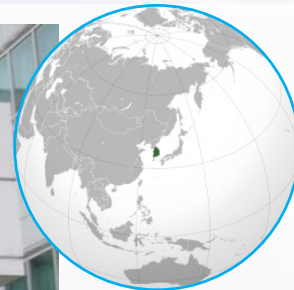
Name	Title	Date & Venue	Sponsor
Nancy T. Lance	Regional Conference on French Technologies in Meteorology	22 – 23 Nov Indonesia	UBIFRANCE
Flaviana D. Hilario	17 th Meeting of the Conference of the Parties (COP 17) of the United Nations Framework for Climate Change Convention (UNFCCC)	29 Nov. – 09Dec.	UNDP MDGF 1656 Project
Rosalina G. De Guzman	International Workshop on Adaptation to Climate Change	24 Nov. – 09 Dec. South Africa	
Susan R. Espinueva	Disaster Mitigation Measures and Recovery Effort of Damaged Infrastructure	04 – 10 Dec. Tokyo, Japan	JICA
Nathaniel T. Servando Catalino L. Davis Lilibeth B. Gonzalez	To visit the relevant institutions and discuss on-going and proposed project in relation to PAGASA' s Doppler Radar long-term maintenance system and capacity building for PAGASA' s Technical Staff	10 – 18 Dec. USA	DOST/PAGASA

**Table 4. FOREIGN FELLOWSHIPS/SCHOLARSHIPS ATTENDED
(Workshop/Training/Seminar/Colloquium)**

Name	Title	Date & Venue	Sponsor
Vivian Grace N. Alisangco	Master of Information Technology	One year commencing January 2011 Australia	Australian Government
Socrates F. Paat, Jr. Sheila S. Schneider	Master of Science and Technology in Spatial Information	- do -	- do -
Maria Cristina C. Uson	Master of Applied Science (Spatial Information Science)	- do -	- do -
Christopher F. Perez Ana Liza S. Solis	Masters of Climate Change	- do -	- do -
Fernando R. Cada Anthony Joseph Lucero	Training Seminar of Application of Seasonal Forecast GPV Data to Seasonal Forecast Products	18 – 21 January Tokyo, Japan	JMA MDGF 1656 Project
Cherry Jane L. Cada	The Dobson Data Quality Workshop	14 – 18 Feb Czech Republic	United Nations Environment Program/World Meteorological Organization Trust Fund
Robert Z. Quinto Roy A. Badilla Vicente Manalo III	Post Disaster Engineering Survey	20 Feb – 05 Mar Queensland, Australia	Australian Agency for International Development
Susan R. Espinueva	Regional Workshop Hydro-meteorological Hazard Risk Reduction and Climate Change Adaptation for Coastal and Small Island Communities	01 – 03 Mar Jakarta, Indonesia	UNESCO
Venus R. Valdemoro	IMGW Workshop for WMO Information and Public Affairs (IPA) Focal Points of Regional Association VI and Regional Focal Points of other Regions	09 – 11 Mar Poland	Polish Institute of Meteorology and Water Management (IMGW)
Esperanza O. Cayanan	Presentation of: "The Effect of Tropical Cyclones on Southwest Monsoon Rainfall in the Philippines" "Formation of the Philippine Twin Tropical Cyclones During the 2008 Summer Monsoon Onset"	21 – 27 Mar Japan	JAMSTEC-RIGC



KOREA





Name	Title	Date & Venue	Sponsor
Rusy G. Abastillas	Regional Workshop on Climate Change and Flood Security in the ASEAN Plus Three Countries	29 – 31 Mar PROC	Chinese Academy of Agricultural Sciences
Bonifacio G. Pajuelas Vicente P. Palcon, Jr.	-40 th China Study Tour -Regional Training Seminar on WMO's Information System (WIS)	11 – 19 Apr 11 – 14 Apr PROC	China Meteorological Organization
Teresa A. Millanes	International Training Course on Microwave Remote Sensing and its Application	04 to 29 Apr India	Center for Space Science and Technology Education in Asia and the Pacific (CSSTEAP)
Rolymer P. Canillo	Training Program on Information and Communication Technologies for Meteorological Services	17 Apr – 14 May Korea	KOICA
Alfredo F. Quiblat, Jr. Fernando R. Cada	Seminar on Economic Development and Climate Change for Asian and European Countries	21 Apr – 04 May PROC	Government of China
Nathaniel T. Servando	Workshop on Advisory Body on ASEAN Plan of Action in Science and Technology	03 – 04 May Indonesia	GIA Project
Vivien S. Esquivel Marcelino Q. Villafuerte	Regional Climate Workshop on Modelling Climate Change Variability in Southeast Asia	10 – 12 May Singapore	National Environment Agency of Singapore PAGASA
Roy A. Badilla	Assessment System of Flood Control Measures (ASFCM) Workshop	23 – 24 May Korea	Ministry of Land, Transport and Maritime (MLTM) Affairs of Korea
Alexander Karl P. Vasquez	Master of Information Technology	June 2011 – June 2012	Australian Government
Thelma A. Cinco	Wind Engineering Workshop	30 May – 03 June Australia	AusAID
Mario M. Raymundo	International School for Advanced Instrumentation (IScAI) 2011 Intensive Course	06 June – 08 July Spain	IScAI/PAGASA
Catalino L. Davis Elena V. tan	Training Course on Management for Meteorological Officials from Developing Countries	15 June – 05 July Nanjing, China	Gov't of China
Juanito S. Galang	Training Workshop on Severe Weather Forecasting	04 – 15 Jul China	PAGASA
Vicente DP. Palcon, Jr.	Regional Readiness for Key Climate Missions (Climate R ³) Workshop	18 – 20 Jul Australia	Dept. of Innovation Industry, Science & Research of Australia
Cynthia P. Celebre	Asia-Pacific Economic Cooperation (APEC) Workshop on Facing the Abnormal Flood Disaster: New Vision for APEC member economies	28 – 29 Jul Vietnam	APEC
Esperanza O. Cayan Marcelino Q. Villafuerte	2 nd Monsoon Asia Hydro-Atmosphere Scientific Research & Prediction Initiative/Hydrospheric Atmospheric Research Center (MAHASRI/HyARC) International Workshop	22 – 24 Aug Vietnam	JAMSTEC
Maria Cecilia A. Monteverde	International Training Course on Weather Modification	22 Aug- 02 Sept Beijing, China	CMA PAGASA
Rolymer P. Canillo	3 rd Asia-Pacific Economic Cooperation (APEC) Seminar on Protection of Cyberspace to Better Defend our Economies through IT Security	07 - 08 Sep Korea	APEC



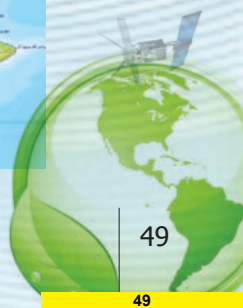
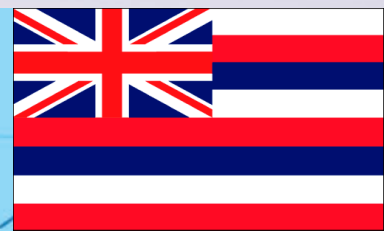
Name	Title	Date & Venue	Sponsor
Roy A. Badilla	Workshop on Intercomparison of Flood Forecasting Models – Decision Making for their Selection and Application	14 – 16 Sept Germany	WMO
Fredolina D. Baldonado Maximo F. Peralta Remigia N. Borbon Marc Francis C. Calpo Danilo D. Flores	Training Course on the Establishment of an Early Warning and Monitoring System for Disaster Mitigation in Metro Manila	18 Sept – 01 Oct Korea	KOICA
Esperanza O. Cayanan	WMO RA V Training Course on Satellite Applications for Meteorology and Climatology	19 – 27 Sept Indonesia	Indonesia Agency for Meteorology, Climatology and Geophysics (BMKG)
Sonny N. Pajarilla Nivagine C. Nievares Ma. Ana Glaiza Escullar Gladys Saludes	Roving Seminar 2011	20 – 23 Sept Malaysia	Typhoon Committee Trust Fund (TCTF)
Sharon Juliet M. Arruejo Rusy G. Abastillas	Workshop on Multi-Model Ensemble Seasonal Prediction over South East Asia	20 – 23 Sept Singapore	Association of South East Asian Nations – Republic of Korea Special Cooperation Fund
Jori J. Loiz	2011 Typhoon Committee Research Fellowship Scheme	01 Sept – 30 Nov Korea	Korea Meteorological Administration
Thelma A. Cinco	International Workshop on Coordinated Regional Downscaling Experiment (CORDEX) East Asia	22 – 23 Sept Korea	Korea Meteorological Administration
Edino Nonato L. Nolasco Meliton Pio F. Guzman	Collaborative Scientific with the Geoscience Australia (Greater Metro Manila Area Risk Assessment Project)	26 Sept – 07 Oct Australia	AusAID
Marcelino Q. Villafuerte II	A three-year Doctoral Course at the Department of Geography, Graduate School of Urban Environmental Sciences	27 Sep 2011 – 27 Sep 2014 Japan	Tokyo Metropolitan Government (TMG)
Flaviana D. Hilario Daisy F. Ortega	APEC Climate Symposium 2011: Harnessing and Using Climate Information for Decision Making	17 – 20 Oct Hawaii, USA	Hilario – APEC Ortega – MDGF 1656 Proj
Vicente C. Manalo III	Monsoon Heavy Rainfall Workshop	12 – 14 Oct China	WMO
Nestor B. Nimes	Seventh TCP/JCOMM Workshop on Storm Surge and Wave Forecasting	10 – 14 Oct China	WMO
Bernard R. Punzalan II	International Training Course on Agrometeorology	17 Oct - 04 Nov China	PAGASA
Shirley J. David Michael S. Bala	Training Workshop on Mesoscale Numerical Weather Prediction	16 – 29 Oct Malaysia	
Flaviana D. Hilario Daisy F. Ortega	APEC Climate Symposium 2011: Harnessing and Using Climate Information for Decision Making	17 – 20 Oct Hawaii, USA	
Renito B. Paciente	International Workshop on Rapid Changes in Tropical Cyclone Intensity and Movement	18 – 20 Oct China	
Niño A. Relox	Regional Workshop on the Use of Space Technology for Human Health Improvement	23 – 26 Oct Iran	



Name	Title	Date & Venue	Sponsor
Roy A. Badilla	Regional Workshop and Training Course on Flood Forecasting and Warning	24 - 28 Oct China	WMO and Bureau of Hydrology, Ministry of Water Resources of People's Republic of China
Edna L. Juanillo	Regional Climate Issues in Developing Countries Workshop, and The World Climate Research Program (WCRP) Open Science Conference	24 - 28 Oct USA	MDGF 1656 Proj
Vicente B. Malano	RA V Regional Seminar on Climate Services	01 - 04 Nov Solomon Islands	WMO
Shirley J. David Cynthia P. Celebre Flaviana D. Hilario Ma. Elena V. Tan Jayson W. Bausa Ricarte Fabregas	Asia Pacific Economic Cooperation (APEC) Research Center for Typhoon and Society (ACTS) 2 nd Workshop entitled "Typhoon and Landslide Disaster: Prevention, Mitigation and Social Resilience Capacity Building."	02 - 04 Nov Taiwan	Airfare - Taiwan DSA - PAGASA
Jorybell A. Masallo	Typhoon Climate Center (TCC) Training Seminar on One-month Forecast Products Twelfth Joint Meeting for the Seasonal Prediction of East Asian Winter Monsoon	07 - 09 Nov 10 - 11 Nov Both in Japan	Japan Meteorological Agency
Renito B. Paciente	Integrated Workshop "Damage Assessment Methodology and Pre-Assessment of Typhoon Landfall Impact"	07 - 11 Nov Viet Nam	Typhoon Committee Trust Fund (TCTF)
Ferdinand Y. Barcenas Roberto M. Celebre	CIMO Training Workshop on Metrology for the English-speaking countries of Region V (South-West Pacific)	21 - 25 Nov Australia	WMO - Barcenas PAGASA - Celebre
Lazaro M. Marqueses	International Training Workshop on Implementing Competency Assessment for Aeronautical Meteorological Personnel	05 to 09 Dec China	Hong Kong, China
Samuel F. Duran Gener M. Quitlong	International Training Course on Tropical Cyclone	05 - 16 Dec. China	WMO/PAGASA
Nivagine C. Nievares	3 rd Global Precipitation Measurement (GPM) Asia Workshop on Satellite Precipitation Data Utilization	07 - 09 Dec. Tokyo, Japan	JAXA



HAWAII





IMPROVEMENT OF S & T GOVERNANCE, MANAGEMENT AND LINKAGES

A Performance and Review and Analysis of the performance of the functional division of the agency was conducted simultaneously with the Planning Conference for FY 2011 Programs and Priority Thrusts from 2012-2013 near the end of the third quarter. The Annual PAGASA PRA and Planning Conference was conducted on 03-04 January 2011 at the Days Hotel, Tagaytay City. The review identified some key activity areas in 2011 work plan that needed revision and some pressing concerns that needed immediate solutions. Priority programs and recommendations for incorporation in the 2011 Action Plan and those for consideration in 2012-2013 Financial

2011 commitments. The Mid-year PRA was very timely in line with the concerns of the Secretary which were addressed.

Monthly Climate Outlook Forum was held at Amihan Conference Room, Central office PAGASA from January to December 2011. The Forum was attended by representatives from the various agencies of government and private sector entities. The Forum serves as avenue to increase the level of awareness of the participating agencies from public and private sectors to be updated on the development of the La Niña phenomenon, the review of the climate conditions, the status of major dams, and extended forecasts, among others. As tradition in the previous forums, participants were encouraged to actively participate in the discussions, towards a fruitful meeting of minds.

matters were likewise drawn up. All heads of branches/divisions presented their highlights of accomplishments for the 2nd semester of FY 2010 and possible solutions to the identified problems. Likewise, Mid-year PAGASA PRA and planning conference was also conducted on 18- 20 August 2011 at the Buena Casa, Hotel, Subic Bay Freeport Zone, Zambales The PAGASA Mid-Year PRA involved assessment of the performance of all various operating units based on the Priority Programs/Activities for the first semester of FY 2011 and review of the 2nd semester FY 2011 Operations Plan. The discussions were focused on the vital issues and concerns on the implementation of the program and activities for the FY





LOCAL AND INTERNATIONAL LINKAGES AND COLLABORATION

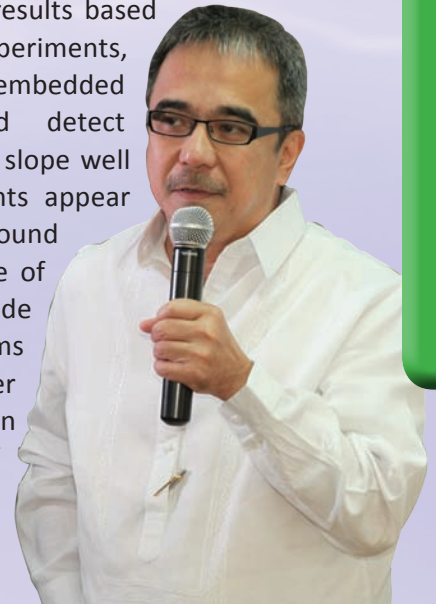
Collaboration with local and international organizations is continuously and actively done in terms of exchanges of information on meteorology and related fields; technology transfer; and financial grants/support for the socio-economic programs. As part of its international commitments, particularly with UN agencies and the WMO, country representation was provided in international scientific fora.

PAGASA participated in the Launching of “DOST-kusyon” La Niña update and seasonal climate outlook for 1st quarter 2011 and DOST Region & Projects in support to Disaster Stricken Communities,” held at Amihan Conference Room, Central Office, PAGASA on January 19, 2011.

The launching of DOST-kusyon was held aiming to provide, as envisioned, a venue to discuss new technology development being done by attached agencies of DOST. One of these technologies is the hazard warning device by the DOST and UP’s Electrical and Electronics Engineering Institute. All locally developed, the device consists of automatic rain gauges, water level gauges, weather monitoring stations, and landslide monitoring sensors. DOST and UP’s EEI are expected to roll out this landslide early warning system technology within the year. According to Secretary Montejo, the DOST is accelerating the deployment of

ten sensors on ten sites all over the country which are disaster prone. The device will enable DOST to generate data on disaster areas. Since the sensors are locally developed, they will cost much less than their imported counterparts.

The group described the instrument as a prototype “electronic sensor column” capable of measuring incipient movement or pore-water pressure build up in affected slopes. It is developed and tested at the laboratory-scale. The use of wireless communication technology makes possible real-time monitoring of affected slopes. Initial results based on laboratory experiments, indicated that sensors embedded in the slope could detect deformation within the slope well before these movements appear visually on the ground surface. As such, the use of these sensors in landslide monitoring systems offers potentially greater lead time between initial detection of slope movement until eventual failure and collapse of the slope.



PAGASA’s involvement in the launching of the projects was to present the weather update for the next five (5) days which was presented by Mr. Robert Sawi, OIC Weather Division; Seasonal Climate Forecast for the 1st semester and La Niña Update, by Dr. Flaviana DL. Hilario; and the Status of DAMS by Dr. Susan R. Espinueva. Secretary Montejo presented the invention of the DOST-UP landslide early warning system, and Dr. Carol M. Yorobe reported on Secretary Montejo’s visit to Leyte/.Biliran/Southern Leyte on the DOST-SET-UP projects.

The DOST-Kusyon launching was held at Amihan Conference Room, PAGASA Central Office on January 19, 2011 attended by DOST Secretary Mario G. Montejo, Undersecretary for Regional Services Dr. Carol M. Yorobe, Undersecretary for R & D and OIC, PAGASA Dr. Graciano P. Yumul, Jr., Mr. Raymund E. Liboro, Director STII, OIC for Administrative and Engineering Services Engr. Catalino L. Davis, and members of the executive staff of PAGASA, media group namely, RPN 9, ABS-CBN, GMA, channel, Manila Standard, Manila Bulletin, Philippine Star, Inquirer, Tabloid and others.

Conduct of “Climate Change Forum” in Bethel Guest House, Dumaguete City on February 28, 2011 and Baywalk Garden Hotel, Boulevard Extension, Masbate City on April 27, 2011





The climate change forum was conducted at Bethel Guest House in Dumaguete on February 28, 2011 and at Baywalk Garden Hotel in Boulevard Extension, Masbate City on April 27, 2011. A total of 122 participants in Dumaguete attended the forum while in Masbate a total of 96 participants from the different sectors; from academe, barangay and municipal officials, agricultural, industrial, students and non-government organizations participated. The climate change forum is one of the component of the project entitled “Strengthening meteorological hydrological activities to support the climate change adaptation in the Philippines”. An intensified information dissemination campaign to improve public awareness and education program on the impacts of extreme weather and climate events such as typhoon, El Niño, etc. for the various sectors that are highly vulnerable to disasters including climate change scenario in the Philippines. The project aims to improve the effective delivery of services to the public and enhancing effectiveness of forecasts and information services for weather -related disaster mitigation and preparedness.

The Honorable Manuel T. Sagarbarria, the Mayor of Dumaguete, was present during the Forum while in Masbate, the Administrator of the Masbate provincial office, Mr. Agerico J. Aguilar graced the occasion. Hon Sagarbarria and Administrator

Aguilar both stressed the need to promote these information on climate change which is very helpful in agriculture, shipping industry, academe, especially the general public. Lessons learned from the lecture aims to increase the level of awareness of the populace.

Among the topics discussed during the forum were: PAGASA Profile, Understanding Hydro-meteorological Hazards, Climate Risks /Vulnerabilities and Climate Change Scenario in the Philippines and the present vulnerability situation in the Philippines was discussed including the damages caused by tropical cyclones, impacts of El Niño/La Niña, and the vulnerability of water resources to Climate Change, The main cause of global warming, both natural and man-made i.e., volcanic eruptions and greenhouse gas emissions, among others were also discussed. A presentation on Climate Change Projection in the Philippines in 2020 – 2050, Basic of ENSO El Niño/La Niña and typhoon tracking exercise were also done. The typhoon tracking exercise aims to familiarize the participants in tracking tropical cyclones entering the Philippine Area of Responsibility (PAR). The participants were given a situation where they will predict the next position of TC.





Conduct of the 1st ACTS Workshop 2011: Management of Typhoon and Heavy Rainfall Related Disaster held at Crown Regency Hotel Cebu City on May 25-27, 2011

The 3-day workshop allowed meteorologists and disaster managers from different countries to work together as one group, share experiences specifically in addressing typhoon and heavy rainfall related disasters. It was participated by thirty three (33) personnel from the APEC member countries namely: Taiwan, Korea, Mexico, China, Myanmar, Malaysia, Thailand and the Philippines. The workshop aimed to 1) promote scientific understanding of typhoon characteristics, particularly of the interactions among typhoons, monsoons, and complex terrains 2) promote socio-economic awareness on typhoon impact and social vulnerabilities in order to reduce the resulting damages, minimize loss of lives, properties and infrastructures, and allow better management of resource utilization, and 3) establish a platform that will facilitate the sharing of experiences and data exchange, where more comprehensive data and scientific findings can be pooled through the collaboration between organization on the mitigation of the impact of typhoons.



The workshop included lectures, group work and presentations. Lectures from various well-known institutions such as: Nagoya University, Central Weather Bureau (CWB), Center for Disease Control, APEC Research Center for Typhoon and Society (ACTS), Naval Postgraduate School, Office of Civil Defense and Ming Chuan University which shared their expertise in their respective fields. Participants were allowed to ask and clarify certain things related to their specialization. Lectures of the workshop involved four aspects: Monitoring Technology, Forecasting Application, Response Strategies and Social Impacts.

Among the topics discussed during the workshop were: Current Monitoring Technology, Current Technology II on Satellite and heavy rainfall, Meteorological Radar Applications I – Demo of using monitoring technology on typhoon forecasters for early warning Socio economic impacts- Post Disaster public health/infectious diseases, Centers for Disease Control, Social impacts-Financial consideration on post-disaster recovery, Meteorological application II – Climate change and tropical cyclones-what are the implications for typhoon hazards, Response Strategies I- Emergency preparedness and Emergency response. The participants were able to acquire knowledge and understanding of the current techniques on observing heavy rainfall and land falling typhoons for the provision of early warning and preparedness to the general public. More specifically the participants were able to recognize typhoon monitoring and weather forecast information for early warning system, to respond to potential hazards based conceptual and operational guidance, to discuss post-disaster impacts on society, to and identify potential impacts under climate change trend.

An important component of the workshop was the practical synthesis and application information learned during the lecture sessions of the program. Participants were able to immediately put their newly gained knowledge to use and strengthen their grasp and understanding of the information. Indeed, knowledge is power, and being prepared and ready before disaster strikes is the best way to confront and minimize the resulting damages.

PAGASA-DOST needs to apply the methodologies learned from the previous workshop and to invest in capacity building to allow PAGASA personnel to enhance existing knowledge and skills with respect to the right usage of RADAR, proper interpretations of satellite images and adaptation of climatological approach in forecasting typhoon track and associated rainfall. Through these, better services and improved forecasts can be delivered.

PAGASA-DOST was able to strengthen the linkages with the ACTS leaders, lecturers and APEC member countries. Future collaborations, trainings and assistance from the lectures are also expected.



PAGASA partnership with Nido Fortified Science Discovery Center (NFSDC) launched Tracking the Sky, DOST- PAGASA Exhibit held in NFSDC, Mall of Asia, Pasay City on September 05, 2011

PAGASA in partnership with the Nido Fortified Science Discovery Center launched an exhibit entitled Tracking the sky at NFSDC, Mall of Asia, Pasay City on September 05, 2011.

The exhibit aimed to educate the public on climatology, meteorological system, and early warning and response system for disaster. The exhibit showcased the function of PAGASA as the government agency which regulates meteorology, hydrology, geophysics and astronomy in the Philippines.

Tracking the sky PAGASA exhibit hoped to enlighten the minds of the Filipinos about the importance of early warning systems for floods, and be prepared in the possibility of a storm with a magnitude similar with Typhoon Ondoy.

The launching started with the registration of attendees, followed by Invocation and National Anthem. In his welcome remark, Sr. Operations Manager, NFSDC, Mr. Arturo C. Carballo, Jr. said that their partnership with DOST started when the nuclear awareness exhibit with Philippine Nuclear Research Institute was launched in June 2011. NFSDC expressed pleasure to be working with DOST through PAGASA again. He added that it was an honor for the Center to be involved with the works of DOST.

Being a part of the country's interactive science center, Mr. Carballo truly supports the efforts of DOST-PAGASA in educating the public on the early warning and response system since it is beneficial to the Filipino to be aware and prepared for natural disasters. He extended his appreciation and congratulations to PAGASA-DOST for choosing them as partner and venue for the Tracking the Sky Exhibit. He stressed that PAGASA-DOST could trust they at Nido Fortified Science Discovery Center will support future endeavors in educating every Filipino regarding the science and technology.

On the part of PAGASA, Dr. Nathaniel Servando, Administrator,

PAGASA was not able to grace the said activity but he was represented by Ms. Edna L. Juanillo who read the message of Dr. Servando. In his message he said that he was thankful to the Management of NFSDC for the initiative of promoting science specially PAGASA's services. While PAGASA is in the process of continuing the upgrading of its facilities, as part of the whole strategy for strengthening capabilities on provision of meteorological services, it was also important to educate our different stakeholder on these services, He added that "no matter how accurate and timely the forecasts of PAGASA-DOST, if these forecasts are not understood by its recipient then, they become useless".

Forging the agreement with private companies such as NFSDC/Mall of Asia is a pro-active approach to enhance the country's disaster response capability and will surely contribute to the country's disaster preparedness. This alliance with NSDC will greatly help the PAGASA-DOST to carry out its mission to protect lives and property from hydrometeorological hazards like typhoon and floods. Dr. Servando also acknowledged SM companies, the country's leading shopping malls, but more importantly one which has its own community service program on education, disaster management, community building and environment protection. Last August 2011, the PAGASA was partner in the conduct of the 2-day Disaster Preparedness Summit and Exhibition in Esplanade, one of SM companies.

Given the opportunity for Exhibition in NFSDC for three months, is so far the longest running exhibition where PAGASA participated. Dr. Servando was optimistic that with this partnership PAGASA would be able to help save lives of the Filipino people taking into consideration that stronger tropical cyclones are becoming prevalent causing excessive rainfall which triggers floods, landslides and mudflows. The Eastern Seaboard and the inland areas along the Pacific are highly exposed to coastal inundation due to storm surges accompanying tropical cyclones

that would cause disasters. Climate change and environmental degradation are compounding the problems and are expected to cause even more frequent and widespread devastation.

The activity included the ribbon cutting for PAGASA exhibit, viewing of the PAGASA exhibit, tour at NFSDC facilities and planetarium show.



NIDO Launched the DOST Tracking the Sky Exhibit at The Planetarium, SM Mall of Asia



2011



Inauguration of the APEC Research Center for Typhoon and Society (ACTS) Manila Office held on September 14, 2011.

The inauguration of the APEC Research Center for Typhoon and Society (ACTS) Manila Office was held at the Peninsula Hotel, Manila on 14 September 2011. The Opening Ceremony was led by Secretary Mario G. Montejo of the Department of Science and Technology (DOST), Deputy Minister Cheng-Hong Chen of the Taiwan National Science Council (NSC), Undersecretary Graciano P. Yumul Jr. of DOST and Administrator Nathaniel T. Servando of PAGASA.

The new ACTS Manila Office will serve as a satellite office and regional center that aims to promote localized scientific research on the socio-economic impacts of typhoons to mitigate damages and to better arrange for resource utilization. It will enhance the platform for facilitating data exchange where more comprehensive research data and scientific result can be shared by countries in Asia-Pacific region.

The ACTS Manila Office inaugural event was also attended by DOST Undersecretary Fortunato T. Dela Pena; ACTS Taiwan CEO Jong-Dao “Ben” Jou,; Representative Donald C.T. Lee of Taipei Economic and Cultural Office (TECO); Chairman Amadeo Perez, from MECO and guest from NSC-Taiwan, JICA and representatives from various foreign embassies and officials and staff of ACTS Headquarter in Taipei.

The highlights of the event were the unveiling of marker of the ACTS Manila Office led by Sec. Montejo, and, Deputy Minister Chen and the ceremonial exchanged of tokens from ACTS Taipei and ACTS Manila Office by Dr. Jou and Dr. Hilario.

Dr. Flaviana D. Hilario, Director of ACTS Manila Office, introduced Dr. Cynthia P. Celebre and Ms. Elena V. Tan as the Vice Director and Staff, ACTS Manila Office, respectively.

The 3rd joint Internal Meeting of ACTS Headquarters Taipei and ACTS Manila Office was convened after the inauguration ceremony wherein the duties and functions, as well as protocols for both centers were extensively discussed. Future collaboration and activities of ACTS Taipei were also presented to the ACTS



Manila Officials, Dr. Servando and Ms. Roxanne delos Santos of DOST-International Technical Cooperation Unit (ITCU) were also present during the meeting.



WMO Human Resource Development Workshop for NMHSs in Asia (RA II) and South-West Pacific (RAV) Countries, Crowne Plaza Manila Galleria, Quezon City, 17-24 October 2011.

A workshop on Human Resources Development for NMHSs in Asia (RA II) and the South-West Pacific (RA V) Countries was held at Crowne Plaza Manila Galleria, Quezon City from 17 to 21 October 2011. The interactive workshop included lectures, country presentations on key human resources development issues facing the National Meteorological and Hydrological Services (NMHSs) and working group sessions on specific topics. The main objective of the workshop is to enhance skill development activities for senior and middle-level managers in the areas of management, strategic planning, project development and management, marketing and communication as well as in resource mobilization. This was realized through face-to-face and e-learning activities. The workshop focused on improving the abilities of managers in NMHSs of developing countries, particularly Least Developed Countries (LDCs) and Small Island Developing State (SIDS) to contribute more effectively to national and regional development initiatives, strategies and priorities including those related to the UN Millennium Development Goals (MDGs) through: Enhancing the managerial skills and staff competencies in budgeting

and financial management, succession planning, mobilization of resources with bi- and multilateral partners and in improving policy development and implementation, promoting better understanding of the wider challenges facing the NMHSs and how improved management could contribute towards meeting these challenges including the development and implementation of the Global Framework on Climate Services (GFCS). The workshop was attended by delegates from the following WMO member countries: Australia, Bhutan, Cambodia, Indonesia, India, China, Lao People's Democratic Republic,





Malaysia, Maldives, Myanmar, Oman, Bangladesh, Republic of Korea, Pakistan, Sri Lanka, Tajikistan, Philippines, Thailand, Vietnam and Kyrgyzstan

Among the topics discussed were: Leadership Capabilities and Development, Budgets and Financial Management Framework, Resource mobilization VCP Procedures, HR and Financial Aspects of Project Formulation, Management and Implementation, Management Challenges in Disaster Risk Reduction(a) Leadership Aspects, and (b) WMO Information System (WIS) Also discussed were Key Issues for NMHS's- WMO and Regional Perspective, NMHSs Development Strategies, Internationally Agreed Development Goals, Strategic Planning Case Study (Climate Services) Planning for Improved HR development – Draft WMO Guidelines, Workforce Planning: Framework Workforce Capabilities Performance Management, Succession Planning, Learning & Development System, Quality Management System and Aviation Forecaster Competencies.

Mr. Momadou SAHO, Chief, Training Activities Division, Education and Training Office, World Meteorological Organization in his speech, delivered during the opening ceremony, said that one of the main goals of WMO is the continued strengthening of the capabilities of NMHSs of developing countries, and in particular, LDCs in order to enable them to effectively contribute to national and regional sustainable development. In this regard, human resources development has been systematically identified as a critical input towards achieving this vital goal. The present workshop was organized in order to address such important issues as human resources management and planning, strategic partnerships, organizational changes and their impacts, communication strategies and resource mobilization. The discussions and exchange of views during the five day period will focus on how NMHSs can become more relevant in the national decision-making process, how they can render more reliable services to the user communities and how they can attract more resources to

meet the ever-increasing demands and challenges posed by the rapid advances in science and technology, natural disasters, climate variability and change.

The Asian and Pacific

continents are indeed highly and severely affected by changes and variability in the climate. Already, the number and magnitude of natural hazards are increasing and all sectors of society notably the economy, agriculture and food security, transport, public health, water resources management, energy and tourism are concerned. To address these challenges, it is crucial for decision makers to recognize the role and contribution of the NMHS to government policies and initiatives for mitigating, and adapting to, the negative impacts of weather and climate.

The workshop offered a unique opportunity for the participants to discuss freely and provide mutual feedback regarding the main thrusts and topics, giving due attention to the priorities and special needs of the NMHS of concerned countries. Much of the future success of thier Services in this respect will depend on common ability to work together as one, through formal or informal partnerships within the meteorological and hydrological communities. In this context, it is appropriate during this workshop to look at the current priorities of WMO including the developments on the WMO Information System (WIS), WIGOS, the Global Framework for Climate Services (GFCS) and Disaster Risk Reduction, the qualification and competencies of meteorological personnel and in particular, the aviation meteorological forecasters, and the improved management of the NMHSs in order to render better and reliable services to the public.

The global quest for poverty eradication and food security is unattainable unless genuine solutions are found to the environmental and development problems. In this regard, capacity development, the recognition and enhancement of the roles of NMHSs in sustainable development, and the road map starts with a coherent strategic development plan. The current trend in funding and international development cooperation necessitates that the contributions and needs of the NMHSs must be included in the national development plans.

As part of the workshop the participants were grouped and were tasked to do strategic planning for Improved HR Development aligning their respective action plans and to come up with recommendations based on the lectures.



FINANCIAL AND HUMAN RESOURCES MANAGEMENT

Financial Resource Management

For 2011, the Agency was given a total allotment of P817, 124,000.00 including releases of continuing appropriations from previous years' budget, Grants-in-Aid, and funds from other sources for the implementation of its programs, projects and activities. Total expenditures amounted to P597, 097, 590.63 distributed among the different S & T functions of the agency.

PAGASA Allotment and Expenditures, 2011 by S & T Functions and Expenses Classification

S & T Functions	Allotment				Expenditures			
	TOTAL	PS	MOOE	CO	TOTAL	PS	MOOE	CO
Research and Development	30,874,000.00	3,131,000.00	20,343,000.00	7,400,000.00	23,922,235.55	3,131,000.00	15,131,000.00	5,327,125.00
S & T Services	570,455,000.00	65,606,000.00	316,013,000.00	188,836,000.00	364,862,651.26	65,606,000.00	290,542,781.94	8,713,869.32
S & T Education and Training (STET)	4,578,000.00	222,000.00	4,356,000.00	-	3,558,373.63	222,000.00	3,336,373.00	-
General Administration and Support Services (GASS)	211,217,000.00	169,519,000.00	37,573,000.00	4,125,000.00	204,754,330.19	169,519,000.00	32,596,103.94	2,639,226.25
GRAND TOTAL	817,124,000.00	238,478,000.00	378,285,000.00	200,361,000.00	597,097,590.63	238,478,000.00	341,939,370.06	16,680,220.57



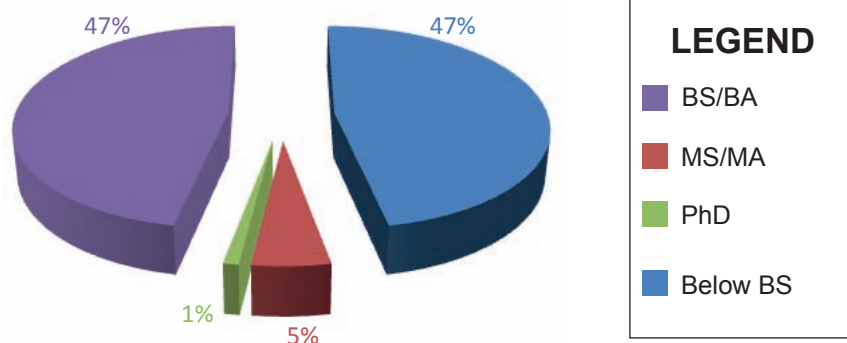


Distribution of PAGASA Personnel, 2011 by Category and level of Education

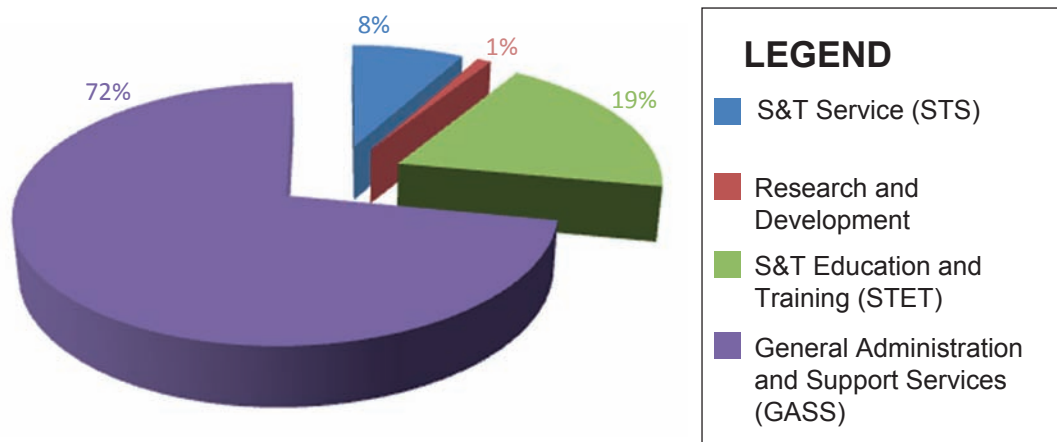
Reference: Plantilla Position as of December 2011

CATEGORY OF PERSONNEL	LEVEL OF EDUCATION				TOTAL
	Below BS	BS/BA	MS/MA	PhD	
S&T Service (STS)	272	277	29	6	584
Research and Development (R&D)	30	46	6	0	82
S&T Education and Training (STET)	3	4	1	3	11
General Administration and Support Services (GASS)	73	107	14	2	196
TOTAL	378	434	50	11	873

PERSONNEL DISTRIBUTION BY LEVEL OF EDUCATION



PERSONNEL DISTRIBUTION BY S&T FUNCTIONS



PAGASA's COMMITMENT FOR THE COMING YEARS

Meteorological, hydrological, climatological and astronomical services are essential to every human activity and to national development, in the long term. PAGASA, therefore, needs to be a dynamic institution not only responsive but also proactive to the ever changing requirements of the various sectors and the general public for weather, climate and flood information services. There is also the changing physical environment and the progressive scientific and technological development that need integration in the agency's development activities. PAGASA envisions that in the coming years, it shall face more challenges and opportunities, which are imperative in meeting the demands of emerging global community. As in the past years, PAGASA is always committed to give the best services and products to the people. To meet these challenges, PAGASA has identified its sets of priorities to be implemented in 2012 to achieve its main goal of improved and enhanced services to better serve the needs of the people. These priorities are consistent with the DOST's vision and within the framework of the Philippine Development Plan 2011-2016, specifically, on climate change adaptation and disaster preparedness and hazard mitigation.

ENHANCEMENT OF WEATHER FORECASTING CAPABILITIES

Automated Data Integration, Analysis and Display System for Timely and Reliable Weather Information for Disaster Mitigation and Decision Support

- ✓ HydroMet Decision Support System (HDSS)
- ✓ Multi-sensor (radar, satellite, gauge network) precipitation measurement and multi-hour forecasting system designed for managing water resources and mitigating risk from heavy rain and flooding.
- ✓ Mesoscale Forecast Decision Support System Highly customized numerical weather prediction using the Weather Research and Forecast (WRF) model and the Uncoupled Surface Layer (USL) model
- ✓ Quantitative Precipitation Estimate (QPE) and Quantitative Precipitation Forecasting/ Nowcasting system (up to 4hr forecast)
- ✓ Severe storm prediction system
- ✓ Integration of 7 radars by February 2012

Doppler Weather Radar Program

- ✓ Operationalize 9 Doppler weather radars (7 GOP funded: Baguio, Baler, Subic, Hinatuan, Tagaytay, Mactan, and Tampakan; 2 JICA radars: Catanduanes and Aparri) – [65% coverage]
- ✓ Installation of JICA radar at Guiuan
Ground works and procurement of 4 additional radars (Zamboanga, Busuanga, Panay and Puerto Princesa) [Panay Radar & Infra requirement for Zamboanga & Busuanga are funded out of Disbursement Acceleration Program (DAP)]
- ✓ Radar data validation/calibration

Rolling-out of Automated Weather Stations, Rain gauges, and Water level sensors

- ✓ Installation of 150 AWS, more WLS and RG (in collaboration with ASTI and DOST ROs.)
- ✓ Identified probable sites for AWS, RGs, and WLS
- ✓ Perform data validation
- ✓ Conduct IEC

Warning system for Marine Navigation and Transport

- Procurement and Installation of 5 locally fabricated Meteorological Buoys (in coordination with ASTI).
- Identified and surveyed probable sites

Redundant Communication System

- Redundant Communication System

HRDP- Improving capacities of PAGASA FORECASTING personnel

- increasing the pool of operational forecasters/ hydrologists
 - 10 Ph.D/M.Sc graduates (Foreign Universities)
 - Meteorologist Training Course (40 new Meteorologists)
 - Meteorological Technician Training Course-MTTC (30 weather observers)
 - Hydrologist Training Course (20 new hydrologists)

STRENGTHENING FLOOD MONITORING, FORECASTING AND WARNING SYSTEM

- Upgrading of the Cagayan River Basin telemetered FFWS
- Upgrading of the Bicol River Basin telemetered FFWS
- Installation of more WLS in 13 major River Basins (in collaboration with ASTI)
- Establishment of FFWS in major river basins in the country
- Survey of river systems

R&D : STRENGTHENING SUPPORT TO CLIMATE CHANGE ADAPTATION RELATED MEASURES

- Rolling-out of Climate Change Projection Scenarios information
- Climate Seasonal Forecast

DRR RELATED S&T PROGRAM/AWARENESS PROMOTION

- Hazard mapping using GIS
- IEC on storm surge, TC and other severe weather hazards
- Establishment of NMCC





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PAGASA KO

Ganap mong adhikain
Kaligtasan ng buhay
Sa pagbabago't
Pagtugon ng kalikasan

Agham na kaakibat ng talino at husay
Sa pinsala'y nagsisilbing
pananggalang

KORO

Sa pagdilim ng mga ulap
Sa gitna man ng unos ay kabalikat
Kaagapay kang lubos
Sa pagtaas ng mga alon
At maging sa tag-tuyo
Sa bawat panahon
Makakaasang PAGASA ko

Ang'yong paglilingkod
Sa bayan na pinag-inam
Ay katiyakang dulot ay kapanatagan

Agham na kaakibat ng talino at husay
Sa pinsala'y nagsisilbing
pananggalang

Sa pagdilim ng mga ulap
Sa gitna man ng unos ay kabalikat
Kaagapay kang lubos
Sa pagtaas ng mga alon
At maging sa tag-tuyo
sa bawat panahon
Makakaasang PAGASA...

Sa pagdilim ng mga ulap
Sa gitna man ng unos ay kabalikat
Kaagapay kang lubos
Sa pagtaas ng mga alon
At maging sa tag-tuyo
Sa bawat panahon
Makakaasang PAGASA ko





MANDATE

As provided for in Presidential Decree No. 78, (December 1972), as amended by P.D. No. 1149, (June 1977), the PAGASA is mandated.

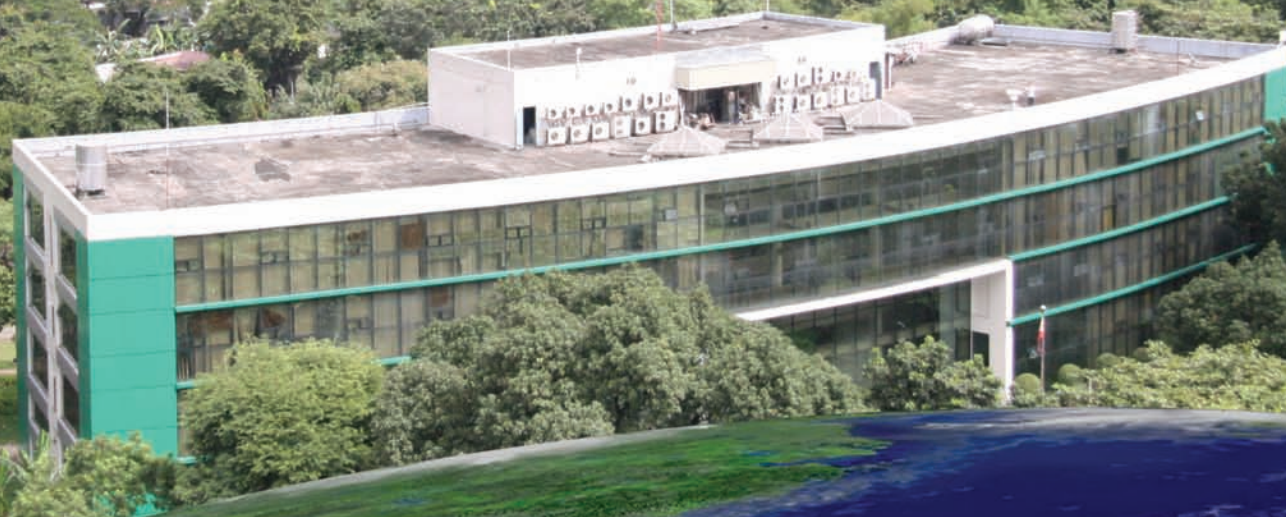
“To provide protection against natural calamities and utilize scientific knowledge as an effective instrument to insure the safety, well-being and economic security of all the people, and for the promotion of national progress.”

VISION

Excellence in meteorology, geophysics, astronomy and the allied sciences that translates to quality products and services beneficial to the nation.

MISSION

To provide weather, flood, climate and astronomical products and services to promote the people’s safety and well-being, and contribute to national development.



DEPARTMENT OF SCIENCE AND TECHNOLOGY



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